Original Article

ANATOLIAN CURRENT MEDICAL

DOI: 10.38053/acmj.1729371

Anatolian Curr Med J. 2025;7(5):563-568

Evaluating the information quality and readability on Turkish Websites about human papilloma virus

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Cite this article as: Dağdelen C, Turan İ, Ceylan ÖO, Erdemoğlu E. Evaluating the information quality and readability on Turkish Websites about human papilloma virus. *Anatolian Curr Med J.* 2025;7(5):563-568.

Received: 28.06.2025 • **Accepted**: 24..07.2025 • **Published**: 15.09.2025

ABSTRACT

Aims: We aimed to determine the quality and readability levels of the texts that health readers access from websites related to HPV.

Methods: 64 websites related to "human papilloma virus" were evaluated by using the Google search engine, in terms of readability and website information quality. The websites were divided into 6 groups according to their origins. Ateşman and Bezirci-Yılmaz readability formulas were used for readability, DISCERN measurement tool and JAMA criteria were used for website information quality and reliability. The information quality and reliability of the websites were evaluated by an obstetrician and gynecologist and a gynecological oncology surgeon.

Results: When the websites were evaluated according to the Ateşman readability formula, the readability score was found to be 57.2 and they were found to be moderately readable. According to the Bezirci-Yılmaz readability formula, the average readability score of all websites was found to be 12.8, that is, a readability at the undergraduate level was determined. When evaluated with the DISCERN tool, the average quality level of all websites was determined as "poor". It was seen that the texts prepared by the obstetrics and gynecology associations and the obstetricians and gynecologists were of higher quality than the other groups. It was observed that the quality of the texts was lower according to the gynecological oncology surgeon.

Conclusion: It is noteworthy that the texts prepared by the obstetrics and gynecology associations received higher quality scores than the other groups. Website information resources prepared by obstetrics and gynecology associations should be increased and the readability and quality of other internet health information needs to be improved.

Keywords: Gynecology, health readers, human papilloma virus

INTRODUCTION

The internet is increasingly used as a source of medical information both by healthcare professionals and patients due to its global accessibility, speed, and cost effectiveness.[1,2] While the rate of internet usage in Turkiye was 82.6% in the 16–74 age group in 2021, one of the most searched about topic on the internet was health-related information at a rate of 65.9%.[3,4]

In the United States, more than 61% of patients already use the Internet to inform themselves about their disease and possible treatment options.[5] Access to useful and understandable health information is an important factor when making health decisions. The internet is crucial to the modern dissemination of health information, but it is clear that the quality varies considerably between sources.[6] Numerous quality assessment tools have been developed to assess the quality of these resources.[7] In addition, written texts about health can cause patients to be misinformed, and lead to incorrect treatment and diagnosis.[8] In these cases, the readability of these texts, as well as their quality, is important.

The human papilloma virus (HPV) is the most common sexually transmitted infection.[9] In general, HPV is responsible for 90% of anal and cervical cancers and about 70% of vaginal and vulvar cancers. More than 200 HPV types have been identified and at least 14 high-risk types that can cause cancer were characterized. Two HPV types (16 and 18) cause approximately 70% of cervical cancers and precancerous cervical lesions.[10] It was determined that seeking information about HPV and sexually transmitted diseases from alternative sources, such as the internet, increases the anxiety of women.[11]

Colposcopic evaluation of malignant and premalignant epithelium of the vulva, vagina and cervix is performed according to certain visual features in terms of contour, color and vascular pattern using magnification after application of acetic acid or diluted Lugol's or Schiller's solution.[12]

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In this study, it was aimed to determine the quality and readability levels of the texts that health readers access from websites related to HPV.

METHODS

Ethics

The study has been approved by the Clinical Researches Ethics Committee of Süleyman Demirel University (Date: 07.07.2022, Decision No: 190). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki.

Included in this study were the first 100 websites that came up when typing the keywords "HPV" into the Google search engine on June 1st. Advertising sites, sites with no information about HPV, forum sites and scientific publications were excluded, and the remaining 64 websites were evaluated for readability and information quality. The origins of the websites (doctor, association, health institutions, newspaper, private laboratory, women's health websites) were recorded. The readability level of these recorded websites was determined and text quality analyses were performed.

While determining the readability level, the formulas of Ateşman and Bezirci-Yılmaz, which are frequently used in Turkish, were employed.

The information quality and reliability of the websites were evaluated by an obstetrician and gynecologist, and gynecological oncology surgeon. These evaluations were made by the two researchers independently, using the DISCERN measurement tool and Journal of the American Medical Association (JAMA) criteria.

Readability Formulas

The Ateşman (1997) readability formula was created by considering two variables, which were the sentence length and word length. The readability score is calculated using these variables.

The formula used to calculate the Ateşman readability score is as follows:

Readability score=198.825–40.175×(total syllables/total words)–2.610×(total words/total sentences).[13]

In the Bezirci-Yılmaz readability formula, variables such as the average sentence lengths and number of syllables affect the readability. The formula was created by using the number of words in the sentence and the number of syllables in the words. The readability formula is as follows:

Readability score=√OKS×((H3×0.84)+(H4×1.5)+(H5×3.5)+(H6×26.25))

Here, OKS is the average word count, H3 is the mean number of 3-syllable words, H4 is the mean number of 4-syllable words, H5 is the mean number of 5-syllable words, and H6 is the mean number of words with 6 or more syllables.[14]

The Bezirci-Yılmaz formula explains the readability level of a text by coinciding with a certain education level according to the education system in Turkiye (**Table 1**).

Table 1. Point of scores

Readability score	Readability level
90–100	Very easy
70–89	Easy
50–69	Moderate
30–49	Hard
1–29	Too hard

Quality Analysis of the Texts

Evaluation was made according to 4 criteria, including authorship, attribution, disclosure, and currency,which are included in the widely used JAMA criteria.[15] During the evaluation, scoring was done by giving 1 or 0 points for each criterion, depending on whether they met the criteria or not. According to these criteria, the score that a website can get as a result of evaluation is between 0 and 4 points.

The DISCERN questionnaire is a valid and reliable tool for analyzing health-related texts.[16] It can be used to evaluate the credibility of the website and whether the sources of evidence are clear. The DISCERN questionnaire, which consists of 3 sections, consists of 15 questions and 1 general evaluation. Questions 1 to 8 in section 1 evaluate the reliability of the website, questions 9 to 15 in section 2 are used to evaluate information about treatment options.[16] Section 3 measures the overall quality of the website. Each question is rated on a 5-point scale. An evaluation is made by giving 5 points if the text completely meets the criteria in question; 2, 3, or 4 points are given if it partially meets the criteria, and 1 point if the quality criterion is not met at all. The total DISCERN score is calculated by adding the ratings of the first 15 questions.18 The score can be categorized as excellent (63–75), good (51–62), moderate (39–50), low (27–38) or very low (<27).[17]

Statistical Analysis

The data obtained as a result of the study were analyzed with the PAWS Statistics 18 program. As a result of the analysis, the categorical variables were presented as the percentage and frequency, and the continuous variables were presented as the mean, standard deviation, median, minimum, and maximum. According to the Shapiro-Wilk test, the continuous variables did not show normal distribution ($p>0.05$). The Wilcoxon signed-rank test was used to compare the dependent variables, and the Kruskal-Wallis H test was used to compare more than two independent groups. The Mann-Whitney U test with Bonferroni correction was used for comparisons in groups with statistically significant differences as a result of the Kruskal-Wallis H test. Statistical significance was accepted as $p<0.05$.

RESULTS

In total, 64 websites were examined for readability and the quality of the texts. These 64 websites were evaluated by basically dividing them into 6 different groups according to their origins (**Table 2**). These groups consisted of obstetrics and gynecology associations, newspapers, websites related to women's health, private health institutions, obstetricians and

gynecologists, and private laboratories. Among the websites, the HPV-related texts were mostly created by obstetricians and gynecologists (Table 3).

Table 2. Education level

Grade	Education level
1–8	Primary education
9–12	Secondary education (high school)
12–16	Undergraduate
16+	Academic level

Table 3. Sources percentage of websites

	n	%
Obstetricians and gynecologists	21	32.8
Private health institution	17	26.6
Women's health websites	14	21.8
Private laboratories	6	9.4
Obstetrics and gynecology associations	3	4.7
Newspaper	3	4.7
Total	64	100.0

The websites were evaluated according to the readability formulas of Ateşman and Bezirci-Yılmaz. When the websites were evaluated according to the Ateşman readability formula, the readability score was 57.2, and they were moderately readable (Table 3). When the mean values between the groups were examined, it was observed that the texts on the websites created by obstetricians and gynecologists were the most easily readable, but when all of the groups were compared, it was seen that there was no difference in terms of readability (p=0.624) (Table 3).

According to the Bezirci-Yılmaz readability formula, the average readability score of all of the websites was 12.8, that is, a readability at the undergraduate level was determined. According to the Bezirci-Yılmaz readability formula, there was no difference in readability levels between the groups (p=0.534) (Table 3).

When the websites were evaluated with the JAMA criteria, according to both researchers, there was a statistically significant difference between the quality levels of the websites. According to both researchers, it was seen that the texts created by the newspapers had the lowest score, and the quality level of the texts created by the obstetrics and gynecology associations was the highest (Table 4). In the group evaluations, there was a statistically significant difference between the obstetrics and gynecology association and private health institution websites, between the obstetrician and gynecologist websites and the women's health websites and private health institution websites ($p<0.05$). There was a statistically significant difference between the obstetrics and gynecology association websites and the private health institution websites in the group comparisons according to the gynecological oncology surgeon ($p<0.05$).

When all of the websites were evaluated with the DISCERN tool, it was observed that they got 36 points according to the obstetrician and gynecologist, and 33 points when evaluated by the gynecological oncology surgeon. According to these results, the average quality level of all of the sites was determined as Poor. According to both researchers, it was seen that the texts prepared by the obstetrics and gynecology associations and obstetricians and gynecologists were of higher quality than the other groups. When evaluated by a gynecological oncology surgeon, it was determined that the average quality of the texts created by the newspapers was very poor (Table 5). In the group comparison, there was a statistically significant difference between the obstetrician and gynecologist websites and newspaper websites, according to both researchers.

Significant differences were found between the quality evaluations made by gynecological oncology surgeon and

Table 4. Formulation parameters of websites sources

		Mean	SD	Minimum	Maximum	p-value
Ateşman readability formula	Obstetrics and gynecology associations	53.8	5.3	50.3	60.0	0.624
	Obstetricians and gynecologists	59.4	8.7	41.3	76.8	
	Newspapers	57.7	5.4	51.5	61.0	
	Women's health	53.6	10.9	30.9	73.3	
	Private laboratories	56.8	11.1	44.5	72.1	
	Private health institutions	57.9	7.3	44.8	71.7	
	Total	57.2	8.9	30.9	76.8	
Bezirci-Yılmaz readability formula	Obstetrics and gynecology associations	13.7	0.5	13.2	14.3	0.534
	Obstetricians and gynecologists	12.2	2.7	7.1	17.2	
	Newspapers	11.4	2.0	10.0	13.7	
	Women's health	13.9	3.6	8.7	21.4	
	Private laboratories	13.6	3.4	9.2	17.5	
	Private health institutions	12.4	2.3	8.3	16.3	
	Total	12.8	2.8	7.1	21.4	

SD: Standard deviation

Table 5. Parameters of the type of specialist

		Mean	SD	Median	Minimum	Maximum	p-value
Obstetrician and gynecologist	Obstetrics and gynecology associations	2.0	0.0	2.0	2.0	2.0	<0.001
	Obstetricians and gynecologists	1.9	0.5	2.0	1.0	3.0	
	Newspapers	0.7	0.6	1.0	0.0	1.0	
	Women's health	1.6	1.1	2.0	0.0	3.0	
	Private laboratories	0.8	0.4	1.0	0.0	1.0	
	Private health institutions	1.0	0.5	1.0	0.0	2.0	
	Total	1.5	0.8	1.0	0.0	3.0	
Gynecological oncology surgeon	Obstetrics and gynecology associations	2.0	0.0	2.0	2.0	2.0	0.005
	Obstetricians and gynecologists	1.5	0.7	2.0	0.0	3.0	
	Newspapers	0.7	0.6	1.0	0.0	1.0	
	Women's health	1.6	1.1	2.0	0.0	3.0	
	Private laboratories	0.8	0.4	1.0	0.0	1.0	
	Private health institutions	0.8	0.5	1.0	0.0	2.0	
	Total	1.3	0.8	1.0	0.0	3.0	

SD: Standard deviation

obstetrician and gynecologist with JAMA (p=0.001) and DISCERN tool (p<0.001). It was observed that according to the gynecological oncology surgeon, the quality of the texts was lower (**Table 6**).

DISCUSSION

Today, it's very easy to search the internet for information, and patients often turn to the internet for research about their illnesses. However, there's no data on how accurate this habit is in accessing HPV-related information. This study aimed to determine the quality and readability of texts accessed by health readers on HPV-related websites.

It is known that there are over 100.000 websites providing health-related information.[18] With the increasing use of the Internet and the increase in health information on the Internet, it is seen that the impact on those who seek health information online on their medical decision making is also increasing.[19]

One of the most searched about topics on the internet in Turkiye is for health-related information at a rate of 65.9%.[3,4] While the internet offers tremendous opportunities for sharing information, it also spreads misinformation.[20]

To evaluate the quality of texts on websites, scoring is done according to a set of quality indicators. Today, there are many quality assessment tools.[6] JAMA and DISCERN are among the frequently used quality assessment tools today. In this study, websites about HPV were examined using these two tools. Although it was seen that websites prepared by obstetricians and gynecologists and obstetrician and gynecology associations were of "medium quality" according to both methods, the websites were of "poor quality" when considered in general.

An internet search can influence people's choices about whether or not to receive health care, leading to low-quality health information or content that can easily mislead or worry people.[21] Attention should be paid to health information of varying quality. There are many studies that have carried out quality evaluations on health-related websites using JAMA and DISCERN. Maheshwari et al.[22] examined 60 websites on postpartum pelvic health and reported that the general quality of health information available on the websites was of poor quality.

In another study using DISCERN and JAMA, Jain et al.[23] searched websites about 55 hysterectomy operations and found that the quality level of the online information about hysterectomy was sufficient, but the readability level of these texts was quite low. Although quality assessment tools can show whether a website contains reliable information, they do not predict its readability.[24]

Readability formulas and analysis tools are developed to determine the readability level or difficulty level of a text. In order for texts containing information about health to appeal

Table 6. Comparision of JAMA and DISCERN

		Mean	SD	Median	Minimum	Maximum	p-value
JAMA	Obstetrician and gynecologist	1.5	0.8	1.0	0.0	3.0	0.001
	Gynecological oncology surgeon	1.3	0.8	1.0	0.0	3.0	
DISCERN	Obstetrician and gynecologist	36.4	7.6	37.0	18.0	65.0	<0.001
	Gynecological oncology surgeon	33.0	6.9	33.0	17.0	63.0	

JAMA: Journal of the American Medical Association, SD: Standard deviation

to the general health readers, it should be aimed to reach a readability level between at least the fourth and sixth grades.[25] The use of readability formulas is increasing in order to reach the targeted readability levels in written health information materials, drug package inserts, and consent forms.[26,27]

In this study, in addition to evaluating the quality level of the websites, the readability of the websites was also examined, and the Ateşman and Bezirci-Yılmaz formulas were used to evaluate the readability of the Turkish texts. It was found that these texts were moderately readable according to the Ateşman readability formula, and according to the Bezirci-Yılmaz readability formula, they were readable with an education level of 12 years, that is, approximately at the undergraduate level.

In this case, it was seen that none of the websites included herein met their aims. In other studies that were conducted on the readability of websites, difficult texts were frequently encountered in terms of readability.[28] The readability level in the texts mainly prepared by the obstetrics and gynecology associations for patient education was not suitable for patients, and it is recommended to make appropriate arrangements to improve health literacy.[29] In the current study, it was seen that there were a few websites that provided information about HPV prepared by associations. It is noteworthy that this information, prepared by a small number of associations, received higher quality scores than the other groups.

When women first learn about their HPV carrier status, their susceptibility to anxiety and depression increases. With an appropriate treatment plan and psycho-social support, their anxiety decreases over time.[30] In this case, HPV-related websites with low-quality information and poor readability may increase the anxiety and depression of HPV-positive women and hinder the treatment and follow-up processes.

Studies on the readability and quality of information on health-related websites have been increasing in recent years, but no studies could be found investigating the quality and readability of health websites about HPV. Herein, it was observed that there was an inconsistency between the quality assessments of the two independent researchers. It was seen that the gynecological oncology surgeon scored lower than the obstetrician and gynecologist. It is believed that the reason for this was that surgeons, such as the gynecological oncology surgeon herein, have more up-to-date approaches.

Limitations

Health-related information from the internet can be obtained not only from written texts, but also from various media sources, such as YouTube and social media. In this study, the information obtained from such environments was not evaluated, and there were also factors other than the patient's education level that may affect readability, such as the font and font size. Such factors were not used in the evaluation herein. These conditions can be stated as the limitations of the study.

CONCLUSION

In this study, the health websites prepared on HPV were found to be of insufficient quality and difficult to read. It can be said that the readability and quality of Internet health information needs to be improved.

ETHICAL DECLARATIONS

Ethics Committee Approval

The study has been approved by the Clinical Researches Ethics Committee of Süleyman Demirel University (Date: 07.07.2022, Decision No: 190).

Informed Consent

Since the work information was obtained from websites, informed consent is not required.

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Financial Disclosure

The authors declared that this study has received no financial support.

Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

Acknowledgement

We would like to thank Assoc, Prof. Erhan Okuyan for his contribution.

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