

Evaluation of Information on Turkish Websites Related to the Perfusionist Profession: A Pilot Study on Perfusionist

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Abstract

Aim: This study aimed to assess the quality and adequacy of information available on Turkish websites regarding the perfusionist profession using commonly preferred search engines in Turkey.

Materials and Methods: A descriptive web-based pilot evaluation was conducted using three search engines: Google, Yandex, and Yahoo. The searches were performed using the Turkish keyword "perfüzyonist", as the study aimed to evaluate Turkish-language websites related to the perfusionist profession. The first 20 results obtained from each search engine were included in the analysis. Websites were categorized according to their source type, and the content was evaluated based on predetermined information criteria related to the perfusionist profession.

Results: Among website categories, social media platforms had the lowest content quality score and were classified as inadequate with a mean score of 7.16. Blog pages, news websites, and academic websites demonstrated moderate levels of information quality, with mean scores of 13.54, 10.95, and 14.64, respectively. In contrast, websites belonging to healthcare institutions,

educational institutions, and professional associations achieved excellent scores, with mean values of 21.00, 23.33, and 21.11, respectively. When search engines were compared, Google and Yandex provided good-level information about perfusionism, with scores of 15.40 and 15.10, respectively, whereas Yahoo demonstrated a moderate level of information quality with a score of 13.10.

Conclusion: The findings indicate that Turkish websites do not provide sufficiently comprehensive and standardized information about the perfusionist profession in accordance with relevant professional legislation and regulations. Inaccurate, incomplete, or inconsistent information about the profession remains a significant problem. Therefore, clear content standards should be developed for websites addressing perfusionism and other health professions, and these standards should be monitored by relevant professional and regulatory bodies.

Keywords: Perfusionist, Perfusion Profession, Extracorporeal Circulation, Web-Based Information, Health Professions, Internet Search Engines.

INTRODUCTION

Cardiac surgical procedures performed using extracorporeal circulation techniques (cardiac surgery performed with cardiopulmonary bypass) remain crucial in the treatment of heart disease and are often the only viable option (1). Perfusionists play a vital role within the cardiac surgical team in carrying out these procedures. These professionals emerge as the 'unsung heroes' of open-heart surgery. Perfusionists are licensed healthcare professionals who utilise extracorporeal circulation techniques by bypassing heart and lung function. Furthermore, whilst the historical development of cardiovascular perfusion arose from the need for cardiopulmonary bypass, advancements in extracorporeal support technology have recently enabled it to extend beyond its traditional scope (2).

Health professions in Turkey are defined in Law No. 1219

on the Practice of Medicine and Related Professions; in the 13th supplementary article of the relevant law (Supplementary Article 13 – (Added: 6/4/2011-6225/9)) A perfusionist is defined as 'a healthcare professional who has graduated from a faculty or college offering a bachelor's degree in perfusion, or who has completed a master's degree in perfusion following other bachelor's degree programmes; and who manages extracorporeal blood circulation using a heart-lung machine under the supervision of relevant specialist physicians during interventions on the heart and/or major blood vessels' (3).

Furthermore, the same law stipulates that "any person who, without a diploma or professional certificate, performs work falling within the remit of the professionals defined in this article, or who assumes

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such a title, shall be punished by imprisonment for a term of between one and three years and a fine of between 200 and 500 days" (3).

The duties of perfusionists are set out in the Regulation on the Job and Duty Descriptions of Healthcare Professionals and Other Professionals Working in Healthcare Services, published by the Ministry of Health of the Republic of Turkey in the Official Gazette (No. 29007) on 22 May 2014. In this regulation, the job descriptions for perfusionists are set out as follows (Article 6 – Annex 1): (4).

- ▶ Manages the heart-lung machine, extracorporeal membrane oxygenation and ventricular assist devices (4).
- ▶ Carries out pre-operative preparations relating to perfusion (4).
- ▶ Monitors the patient's physiological parameters, blood gas and blood biochemistry results, and anticoagulation during cardiopulmonary bypass and extracorporeal (off-body) circulation; takes necessary actions and maintains relevant records (4).
- ▶ Performs necessary procedures related to myocardial protection, such as cardioplegia administration (4).
- ▶ Assists in the preservation of donor tissues and organs when required (4).
- ▶ Performs haemofiltration, ultrafiltration and apheresis procedures (4).
- ▶ Performs hypothermia and hyperthermia procedures and regulates body temperature (4).
- ▶ Administer blood and blood product transfusions via extracorporeal circulation equipment, as well as the administration of drugs and medical agents deemed necessary by specialist physicians (4).
- ▶ Ensures the performance of isolated organ and extremity perfusion (4).
- ▶ Accompanies the transport of patients receiving extracorporeal circulation support (4).

The internet is a limitless source of information that enables people to access knowledge quickly and easily, whilst promoting equal opportunities and freedom of choice. Today, the internet has become an integral part

of our lives. Its use has become widespread for a variety of purposes, including communication, acquiring information, shopping and education. The internet has begun to be used by society as an important and powerful source of information, particularly on health-related topics (5). It has also become a significant source of information in career guidance.

There is a wealth of information on perfusion technology available on numerous websites, and these sites are used as a source of information by many sections of the public. In particular, many aspiring perfusionists rely on the information found on these websites when choosing a career. For example: education, employment, financial earnings, etc. Furthermore, advancements in internet technology have enabled numerous perfusion-related websites to provide information to perfusionists. In this study, we aimed to analyse and evaluate the information on Turkish-language web pages regarding the profession of perfusionist, using popular search engines in our country. This study is the first of its kind to be conducted in Turkey on this subject. This study provides an original contribution as one of the first pilot studies in Turkey to evaluate the quality and adequacy of Turkish web-based information related to the perfusionist profession.

➤ MATERIALS and METHODS

In this descriptive web-based pilot study, three popular internet search engines were evaluated: Google, Yandex, and Yahoo. The first 20 results from each search engine were included in the analysis. The searches were performed using the Turkish keyword "perfüzyonist", as the study aimed to evaluate Turkish-language websites related to the perfusionist profession. The searches were carried out between 26 June 2022 and 16 July 2022. All searches were conducted using the same web browser to ensure consistency between search engines. Before each search, browser history, cache, and cookies were cleared to minimize personalization bias. The suitability and accuracy of the information on the websites were determined using Turkish legislation: Law No. 1219 on the Practice of Medicine and Allied Health Professions, and the Ministry of Health Regulation of 22 May 2014 concerning the job and duty descriptions of healthcare professionals and other professionals working in healthcare services. The websites were categorized as blog, press, social media, healthcare institution, educational institution, academic website, professional association, and other sources. The content of the information available on the websites was evaluated according to Table 1.

Table 1 | Assessment score table for the type of knowledge relating to perfusion

1. Has the definition of the profession of perfusionist been correctly formulated?				
Strongly Disagree	Disagree	Partially Agree / Neutral	Agree	Strongly Agree
1	2	3	4	5
2. Have the duties of the perfusionist been clearly explained?				
Strongly Disagree	Disagree	Partially Agree / Neutral	Agree	Strongly Agree
1	2	3	4	5
3. Has the training required for the profession of perfusionist been explained correctly?				
Strongly Disagree	Disagree	Partially Agree / Neutral	Agree	Strongly Agree
1	2	3	4	5
4. Is there accurate information available regarding the perfusionist training curriculum?				
Strongly Disagree	Disagree	Partially Agree / Neutral	Agree	Strongly Agree
1	2	3	4	5
5. Is there accurate information available regarding the working conditions for perfusionists?				
Strongly Disagree	Disagree	Partially Agree / Neutral	Agree	Strongly Agree
1	2	3	4	5

Each question was scored using a 5-point scale ranging from Strongly Disagree (1) to Strongly Agree (5), with a maximum total score of 25. The total scores were categorized as follows: Excellent (21-25), Good (16-20), Moderate (11-15), Poor (6-10), and Very Poor (5).

Statistical Analyses

Statistical analyses were performed using the SPSS® 16.0 software package. Because this was a descriptive pilot study, the findings were summarized using descriptive statistics. Means and standard deviations were calculated for continuous and ordinal data. Percentage analyses were carried out for nominal data. No inferential comparison was performed between search engines or website categories.

RESULTS

In our study, we examined the top 20 websites on the three most widely used search engines in Turkey (www.google.com.tr, www.yandex.com.tr, www.yahoo.com.tr).

Four of the websites on the Google search engine (20%) were blogs, four (20%) were press sites, one (5%) was a healthcare organisation, three (15%) were educational institutions, five (25%) were academic sites, and three (15%) were association websites (Table 2, Figure 1). Of the websites on the Yandex search engine, 5 (25%) were blogs, 5 (25%) were press sites, 1 (5%) was a social media site, 1 (5%) was a healthcare institution, 2 (10%) were educational institutions, 3 (25%) were academic sites, and 3 (15%) were association websites (Table 2). Of the websites on the Yahoo search engine, 6 (30%) were blogs, 7 (35%) were press sites, 3 (15%) were social media sites, 1 (5%) was an educational institution, 2 (10%) were academic sites, and 1 (5%) was an association website (Table 2 and Figure 1).

Table 2 | Distribution and mean content scores of websites according to search engine and website category

Categories of Websites	Search Engines						Average Scores of Website Categories
	Google (n=20)		Yandex (n=20)		Yahoo (n=20)		
	N (%)	Mean	N (%)	Mean	N (%)	Mean	
Blog	4 (20%)	13.50	5 (25%)	12.8	6 (30%)	14.33	13.54
Press	4 (20%)	10	5 (25%)	11	7 (35%)	11.85	10.95
Social Media	-	-	1 (5%)	8	3 (15%)	6.33	7.16
Health Institution	1 (5%)	21	1 (5%)	21	-	-	21
Educational Institution	3 (15%)	20	2 (10%)	25	1 (5%)	25	23.33
Academic	5 (25%)	15.60	3 (15%)	16.33	2 (10%)	12	14.64
Association	3 (15%)	18.33	3 (15%)	20	1 (5%)	25	21.11

N(%)= Number and percentage.

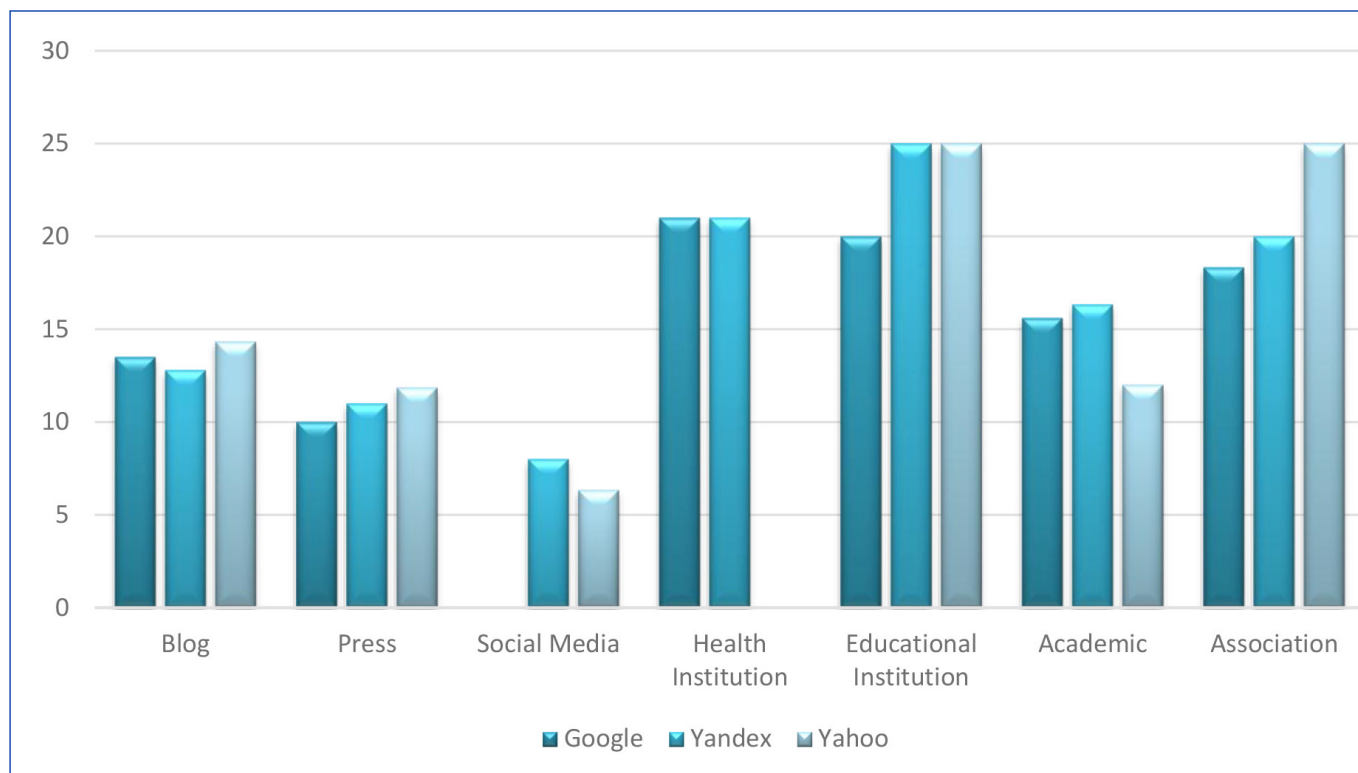


Figure 1. Mean content quality scores of website categories related to the perfusionist profession.

In the category scoring of websites, the lowest content quality score was recorded for social media sites, which were classified as poor with a mean score of 7.16. Blog, press, and academic websites demonstrated moderate-level scores, with mean values of 13.54, 10.95, and 14.64, respectively. Healthcare institution, educational institution, and professional association websites achieved excellent-level scores, with mean values of 21.00, 23.33, and 21.11, respectively (Table 2 and Figure 1). The highest mean scores were observed in educational institution and professional association websites, whereas the lowest scores were observed in social media websites.

In the assessment of perfusionist-related information quality according to search engines, Google and Yandex had higher descriptive mean scores than Yahoo. Google and Yandex were classified as good, with mean total scores of 15.40 and 15.10, respectively, whereas Yahoo was classified as moderate, with a mean total score of 13.10 (Table 3 and Figure 2).

Table 3 | Evaluation of perfusionist-related information quality according to search engines

Content Evaluation Criteria	Search Engines		
	Google, Mean±SD	Yandex, Mean±SD	Yahoo, Mean±SD
Is the definition of the perfusionist profession accurate?	3.15±1.59	3.15±1.59	3.85±1.24
Are the duties of the perfusionist correctly described?	3.15±1.59	3.10±1.61	2.80±1.39
Is the required education for the perfusionist profession correctly described?	2.80±1.82	2.70±1.80	1.90±1.33
Is there accurate information about the perfusionist education curriculum?	3.10±1.58	3.05±1.57	2.70±1.34
Is there accurate information about the working conditions of perfusionists?	3.20±1.43	3.10±1.44	2.80±1.19
Average score of search engines	15.40±7.60	15.10±7.54	13.10±5.85

SD= Standard Deviation.

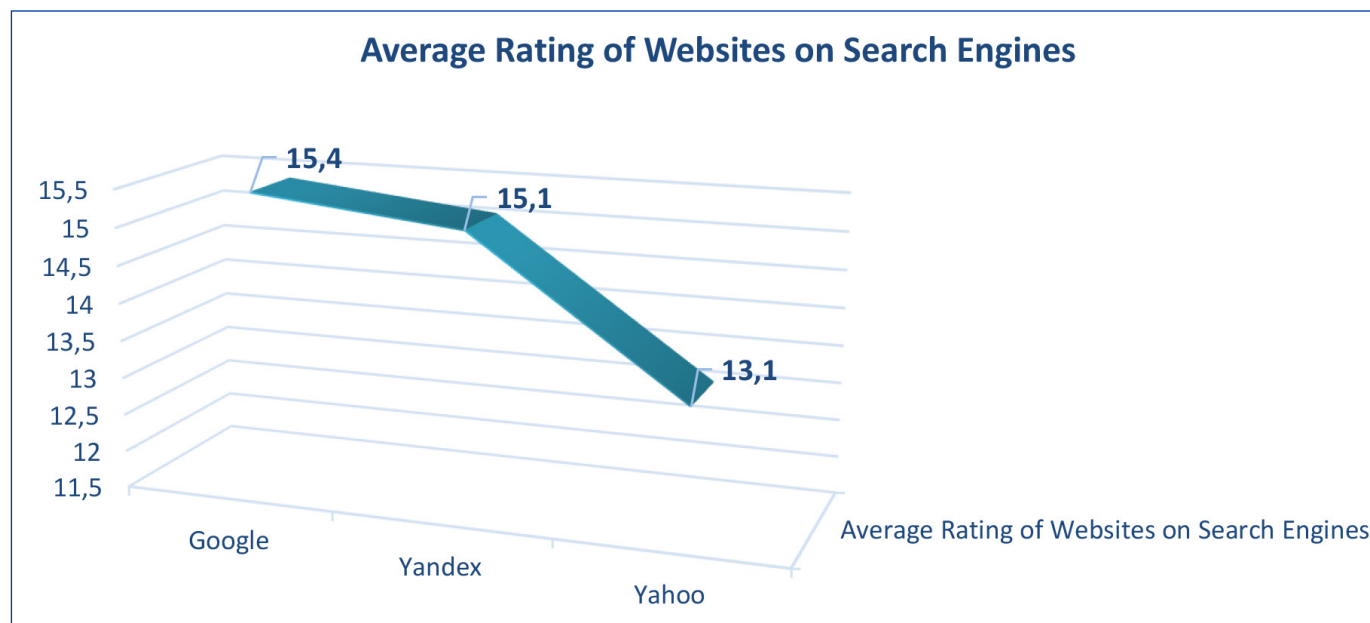


Figure 2. Mean total content quality scores of Google, Yandex, and Yahoo search results.

DISCUSSION

The profession of perfusionist will continue to retain its importance in the near future. This is because cardiac diseases are among the most common causes of death in developed countries, and this will also become a significant health issue in developing countries in the future (6). Furthermore, coronary artery disease (CAD) is the most common form of cardiovascular disease associated with high mortality and morbidity worldwide (7). In the surgical treatment of these diseases, the cardiopulmonary bypass method is indispensable. In cardiac surgery performed under cardiopulmonary bypass, extracorporeal circulation techniques (perfusion technology) are utilised. The use of extracorporeal circulation techniques has led to the emergence of the profession of perfusion. The profession of perfusion, which emerged in parallel with the development of open-heart surgery, has a history of approximately 50 years (8). During this period, the professional identity of the profession has emerged, and it has evolved into a professional scientific discipline. With technological advancements, perfusion technology has moved beyond its traditional scope and has facilitated numerous new developments. As with any profession, the development of perfusion technology and the establishment of its legal framework have taken time. In line with all these developments, there will continue to be a significant need for perfusionists in the treatment of cardiac diseases in the near future.

The present pilot study demonstrated that the quality and adequacy of Turkish web-based information about the perfusionist profession varied substantially according to website category. Educational institution and professional association websites had the highest mean scores, suggesting that sources directly related to education and professional representation provide more comprehensive information. In contrast, social media websites had the lowest scores, indicating that information presented in these platforms may be incomplete, inconsistent, or less aligned with professional legislation and duty definitions. These findings support the need for standardized and professionally monitored online content about the perfusionist profession.

The internet has not only fundamentally transformed the ways in which society accesses information, but has also brought about significant changes in how people access health-related information. Today, the internet has become the first port of call for anyone seeking information on any subject. As the prevalence of internet use has increased, so too has the frequency with which individuals search for information online. However, unlike other media, the internet is difficult to regulate and control. Consequently, information obtained online without proper oversight can sometimes be cause for concern (9).

With the widespread use of the internet today, there is a wealth of information available regarding the profession

of perfusionist. A wide variety of information can be found online concerning the job description, duties, training, curriculum content, and working practices and conditions. In this study, we aimed to evaluate the information available on Turkish websites regarding the profession of perfusionist.

The most significant finding of this study is that the information on Turkish websites relating to the profession of perfusionist has been identified through a systematic review. Furthermore, the categorisation of website types in the evaluation of this information is another important finding.

A review of similar studies reveals that these studies have noted that information on the internet regarding healthcare professions and health-related topics can sometimes be cause for concern (9-12). In their study, Ceyhan and colleagues (9) aimed to evaluate information on orthopaedic conditions found on Turkish websites. Their findings indicated that, regarding anterior cruciate ligament surgery, Turkish-language sources on search engines were insufficient for informing the public; they emphasised the need to train and encourage internet content creators to produce comprehensive, appropriate and reliable information. They also noted that relevant institutions and professionals have a responsibility to assess the accuracy and quality of online resources and to establish specific standards (9). In a study by Günaydın and colleagues (10), the aim was to evaluate information content regarding asthma on the video-sharing website YouTube. Their findings indicated that videos produced by healthcare professionals were of the highest quality; however, they noted that alternative medicine videos were viewed more frequently. Consequently, they suggested that videos produced by healthcare professionals should be of higher quality and more engaging, and that social media campaigns could be utilised to this end (10). In their study, Balta and colleagues (11) aimed to evaluate the use of YouTube videos in training for video-assisted thoracoscopic pulmonary lobectomy. In their findings, they noted that the use of video-assisted thoracoscopic lobectomy videos in training could have significant potential for improving surgical skills; however, they highlighted issues regarding safety breaches and emphasised that professional communities should focus on promoting and disseminating educational videos (11). In their study, Yeğenoğlu and colleagues (12) aimed to evaluate pharmacy-related websites in Turkey. In their work, they highlighted that the dissemination of international practices and the training of website developers are of great importance in ensuring users

have access to accurate information. They also noted that regulations and training initiatives in this area by pharmaceutical organisations and professional bodies related to pharmacy would yield positive outcomes (12).

An examination of information available online reveals that the absence of basic criteria and standards results in variations in content even on websites prepared by professionals. Utkualp and colleagues (5) conducted a study on this subject. In their study, they evaluated cancer-related information featured on the websites of hospitals in the province of Bursa. They noted that hospital websites covered cancer in terms of varying content and scope. They also noted that establishing basic criteria could be beneficial to enable users to make more effective use of hospital websites (5). The absence of specific criteria and standards regarding information on the internet related to healthcare professions and health issues also highlights the promotional and sensationalist aspects of this field. In this regard, it is concluded that the quality of health journalism must be scrutinised, that greater care is required in reporting on health-related news, and that measures must be taken to prevent such issues (13).

Nowadays, people's desire to be better informed has led to a widespread use of the internet, particularly regarding health-related matters. It is reported that 65.9% of internet users in Turkey conduct health-related searches online. Information whose source is unclear, in particular, can lead to adverse outcomes. For this reason, it is necessary to monitor information sources that could lead to adverse outcomes and to establish specific guidelines (14).

The importance of computer technologies in supporting professional development is coming to the fore. This is because advances in internet and communication technologies will also enable numerous perfusion-related websites to provide perfusionists with detailed and reliable information. In a study conducted by Kim (2003) (15), an analysis of the Korean perfusion website revealed that it offers perfusionists a direction for the healthcare system of the future (15). For this reason, information available online is significant not only for the general public but also for perfusionists.

This study has several limitations. The study was limited to three search engines: Google, Yandex, and Yahoo. Only the first 20 results from each search engine were evaluated, which may not represent all available online information. Because the searches were conducted between 26 June 2022 and 16 July 2022, the findings

reflect the content available during that period. Search engine results may vary over time depending on location, search algorithms, browser settings, and personalization factors. Although browser history, cache, and cookies were cleared before each search to reduce personalization bias, complete elimination of algorithm-related variability may not be possible. In addition, the use of a single keyword may have limited the range of websites retrieved. Finally, because this was a pilot study based on descriptive scoring, future studies should include larger samples, additional search engines, multiple keywords, and more comprehensive validated criteria for evaluating online information quality.

➤ CONCLUSION

We believe that the information available on Turkish websites regarding the profession of perfusionist has great potential to improve public perception of the profession. There are various websites containing information about perfusionists, but these have not undergone peer review. In the evaluations conducted in our study, it was concluded that the information provided was insufficient in terms of compliance with the Perfusionist Profession Act and Regulations, and that there were issues with the information provided regarding the profession. We believe there is a need for professionals or professional bodies within the perfusionist profession to promote and disseminate information, and that specific criteria should be established for website content relating to healthcare professions, which should then be implemented and monitored. Considering the pilot nature of this study, further large-scale and periodically updated studies are needed to monitor the accuracy, adequacy, and standardization of web-based information regarding the perfusionist profession.

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Ethics Approval: This study is based on the compilation and evaluation of information related to perfusionists available on publicly accessible internet websites. As the study does not involve human participants, patient data, or experimental animals, ethics committee approval was not required.

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