Comparing the Reliability of Medical Information on YouTube : An Analysis Based on Keywords and Assessment Tools

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Article

Comparing the Reliability of Medical Information on YouTube: An Analysis Based on Keywords and Assessment Tools

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Abstract: Introduction: With the global population increasingly relying on the internet for information, YouTube has emerged as a significant platform for communication and information sharing, particularly in the field of medicine. However, concerns persist regarding the reliability and quality of medical information on YouTube, given the lack of regulation and guidelines. This study aims to systematically evaluate the reliability of health-related information on YouTube. **Methods:** Data collection was conducted in September 2023 on YouTube, with stringent selection criteria for videos. Videos were evaluated using the "Internet Health Information Certification Standards" by the Korean Medical Association and the Global Quality Scale. A plastic surgeon assessed information quality based on specific criteria. The study analyzed the influence of keywords on information accessibility and compared the evaluation tools. **Results:** 76 Korean search results were analyzed using keywords. Certified South Korean medical providers appeared more in "ptosis surgery" results (50%) than "droopy eyelid diagnosis" (5%). Medical professionals produced 86.7% of videos, with some non-medical content. "Ptosis surgery" had the highest KMA scale score (16.3), "droopy eyelid diagnosis" the lowest (13.8). Out of 76 videos, 39 by plastic surgeons, 20 by ophthalmologists, and 5 by dermatologists. A GQS comparison showed specialists with higher scores (3.12) than non-specialists (1.53). **Conclusion:** YouTube and similar platforms offer valuable access to medical information, but quality and reliability remain significant concerns. Collaborative efforts from government agencies, medical organizations, and users are essential to enhance the quality of online health information. Users should also cultivate critical thinking skills to discern trustworthy information.

Keywords:

Introduction

As of 2022, more than 5.3 billion people, accounting for over 67.9% of the global population, were using the internet. In South Korea, as of 2022, 13,284,218 people were utilizing social networking platforms. [1,2] Among these, YouTube had approximately 785.39 million users as of 2022, focusing on video content, and users were consuming necessary information in video format in their daily lives. [3,4] These characteristics indicated that YouTube had emerged as an important means of communication and information sharing among users, extending beyond being a mere video repository. Especially in the medical field, it played a key role in the dissemination of health information. Consequently, the advertising costs on online platforms, including YouTube, had been on the rise. [5] However, healthcare providers and the government had expressed concerns about the quality of information provided on these platforms, given the lack of regulation and guidelines in the face of the vast amount of uploaded information. These concerns were regarding the reliability of information and the potential for misinformation dissemination.

Hence, the primary objective of this study was to apply a systematic evaluation framework for health-related information to videos discovered on YouTube, utilizing a variety of keywords associated with 'eyelid ptosis' and 'droopy eyelid.' This study specifically targeted users who rely on

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YouTube as a source of medical information. Our intention was to conduct a comparative analysis of the outcomes derived from this assessment.

Methods

The study was conducted in September 2023, with data collection taking place on YouTube (http://Youtube.com) through searches. Prior search history and cookies were deleted, and the search was conducted using the Google Chrome browser with algorithmic elements excluded. The top 20 videos were selected for evaluation after entering search queries, and the following types of videos were excluded when selecting videos:

1. YouTube shorts
2. Videos without voice
3. Duplicate content
4. Videos classified as mere advertisements.

The video evaluation in this study, based on the search results in Korean, was carried out using the "Internet Health Information Certification Standards" developed by the Korean Medical Association (Table 1). This consisted of reliability assessment, format evaluation, and content evaluation, with each consisting of several components. Additionally, the evaluation was conducted according to widely used evaluation criteria for health information using the Global Quality Scale (GQS) (Table 2) [7,8]. One plastic surgeon assessed information quality, applying scientific reliability evaluation criteria to six specific components out of a total of 20 items. The remaining 19 items were evaluated based on a "yes" or "no" rating criterion, resulting in a maximum score of 24 points. The study also included an evaluation of the producers based on whether the video was produced by a certified medical service provider in South Korea or by medical professionals. Furthermore, evaluations were conducted to identify the presence of non-medical information. The search terms included "eyelid ptosis" and "droopy eyelid" as the main keywords in Korean and "surgery," "hospital," and "diagnosis" as additional keywords, resulting in the creation of a total of six search queries. They were all searched in Korean, as detailed in Table 3.

Table 1. Korean Medical Association's Internet Health Information Certification Standards.

	Assessment	Criteria	Description	Annotation
Reliability	Creator credibility	Responsibility	Can you identify who created the site or who the representative or entity is that can take overall responsibility for the information the site provides?	1. information about accountability should be available within one click from the home page. 2. make it easy to find liability on the homepage. 3. recognize not only individual names but also corporate names and organizations such as hospitals. 4. even if there is no specific mention of liability, it is acceptable if the name of the representative, organization, company, hospital, etc. can be identified.

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		Authorities	Is the entity operating the site a physician or health care provider, or a health care professional or organization as defined by applicable law?	1. determine if the person or entity is a healthcare professional. If the liability is no, it is automatically no. If the organization is a business, mark yes if the primary purpose is to provide medical information or no if the primary purpose is to sell certain drugs, etc.
		Openness	Is the contact information, such as an email address or phone number, for the website's creator or person in charge, displayed in a recognizable way?	1. the contact information, such as email or phone number, must be available on the main page or in a single link. If it's more than one link, it's a no, even if you have contact information.
	Clarity of sponsorship	Ads	If you have ads, are you mentioning that they're ads or labeling them in a way that clearly identifies them as such?	1. check Yes if the ad is displayed as a separate box, pop-up, banner, etc. that can be easily identified. 2. judge only the main homepage of the site.
		The creation date	Is the last updated date of the health information provided on the site clearly stated?	1. a program that simply displays the current date or time is a "no". There must be a statement about when it was updated or modified
	Information Delivery Formats	Purpose	Is there any mention of the site's introduction or purpose?	1. it is acceptable to have only one of the following: an introduction to the site (including a description) or the purpose of the site. 2. a mention of it must be visible within one click from the homepage.
		Complementarity	Is there any mention that the information provided on the site is meant to supplement, not replace, the care of a physician?	
Format evaluation	Author credibility	Verify authorship	Does the webpage content list an author or creator?	1. Give credit to the source or author of the article. If the article is taken from another source, it should be

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				acknowledged with a citation. 2. Acknowledge that you have reviewed the material. 3. Even if the information is available elsewhere, it should only be recognized if it is clearly stated on the webpage.
		Authority	Does the content of the webpage indicate that the author or reviewer of the webpage is a physician or other health care professional as defined by applicable law?	1. It is also recognized if it was edited. 2. If the webpage specifically states the qualifications of the practitioner, doctor, etc. or creates a link to a webpage that displays the qualifications.
		Openness	Does the content of the webpage list the author's phone number or email address?	1. it is acceptable to list the contact information of the author as well as the person whose content is quoted and posted on the Internet. 2. except when a formal webmaster's email is provided that is not related to the author or the person quoted. 3. must be specified on the webpage. Bulletin boards are not recognized.
		Creation date	Does the webpage content indicate the date the information was created/completed?	1. must be displayed on that page, regardless of the homepage. 2. except when simply displaying the current time, date, etc.
	Information Delivery Formats	Source	Do you provide sources or references in your webpage content?	1. If there is a citation or reference anywhere in the text, it is recognized. 2. Even if only part of the text is marked with a citation, it is recognized.
Content evaluation		Scientific soundness	Scientific Soundness The overall content of the medical information you evaluated is consistent with the following?	

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		1. well-established information found in medical textbooks or equivalent (5) 2. information that is not fully established orthodoxy but has sufficient clinical evidence (4) 3. some (less than 20% of the information) is controversial, but has some evidence (3) 4. substantial (>20% of the information), controversial, unsound information with weak evidence (2) 5. information that has been shown to be a medical error (1) 6. information that cannot be verified (0)	
	Harmfulness (1)	Is the content of the webpage harmful to the general public?	1. focuses on harmfulness rather than content fault.
	Harmfulness (2)	Is there anything on the webpage that explicitly encourages harmful behavior?	2. recognize only when the content is deemed by the evaluator to be very clearly harmful.
	Harmfulness (3)	Does the content of the webpage include anything that could lead to unnecessary health behaviors or waste?	1. is a direct recommendation to purchase an item or service. 2. It is considered wasteful if it recommends a specific treatment that is not objective or not medically necessary at all. 3. Various factors can be listed in the process of treatment, so if any of them are present, it is judged as 'present'.
	benefits	Is the webpage content informative overall?	
	balance	Does the webpage provide a balanced presentation of different treatment options?	1. at least two treatments are presented, including at least one essential treatment (unless there is only one essential treatment), and if the

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			essential treatment is ambiguous, at least one comparative explanation is acceptable.
	Commercial	Is there any advertising in the content of the webpage?	look for content that is independent of formalities such as banners.
	Benefits and risks of diagnosis and treatment	Are you explaining the pros and cons of a diagnosis or treatment method?	acknowledge the existence of a single pro or con statement.

Table 2. Global Quality Scale.

Score	Global Score Description
1	Poor quality, poor flow of the video, most information missing, not helpful for patients
2	Generally poor quality and poor flow, some information listed but many important topics with limited use to patients
3	Moderate quality, suboptimal flow, some important information is adequately discussed, but other information is poorly discussed, so somewhat useful for patients
4	Good quality, generally good flow, most relevant information is covered, is useful for patients
5	Excellent quality and flow, very useful for patients

Table 3. Search queries.

Korean letters	Pronunciation	Translation to English
안검하수 수술	Angeomhasu susul	Ptosis surgery
안검하수 병원	Angeomhasu byeongwon	Ptosis hospital
안검하수 진단	Angeomhasu jindan	Ptosis diagnosis
눈처짐 수술	Nuncheojim susul	Droopy eyelid surgery
눈처짐 병원	Nuncheojim byeongwon	Droopy eyelid hospital
눈처짐 진단	Nuncheojim jindan	Droopy eyelid diagnosis

Statistical analysis

Data analysis in this study was conducted by dividing the data into multiple groups and using ANOVA analysis, chi-square tests, and t-tests. Descriptive methods such as means, standard deviations, minimum values, and maximum values were used. Results were evaluated at a 95% confidence interval, with significance set at $P < 0.05$.

Results

By combining the two main keywords and three additional keywords, a total of six Korean search results were obtained. A total of 76 videos were analyzed, excluding duplicate videos from the top 20 videos for each keyword. The data in Table 4 summarizes the views, video lengths, GQS, and KMA's scale for these videos.

Table 4. Analysis of Video Clips.

	Minimum	Maximum	Mean (SD)
Number of Views	54	1040804	79019.5 (191360.8)
Length (second)	88	3074	437.5 (376.94)
GQS	1	5	2.7 (0.96)

 doi:10.20944/preprints202310.1007.v1

KMA scale	6	18	14.8 (2.43)

YouTube provided a marker for South Korean certified medical service providers, and 50% of the "ptosis surgery" search results were produced by South Korean certified medical service providers, whereas "droopy eyelid diagnosis" search results showed the lowest ratio at 5% (Table 5). The ratio of South Korean certified medical service providers in search results related to "ptosis" was 40%, and in those related to "droopy eyelid," it was 10%. This indicated a tendency for videos produced by certified medical service providers to be more easily searchable when medical terminology was used. However, medical professionals or hospitals produced 86.7% of the videos, and there were also non-medical videos produced by various creators, including 2 vlogs or reviews, 1 news video, 3 produced by physical therapists, and 1 produced by a Pilates instructor. According to the Internet Health Information Certification Standards of the Korean Medical Association, the search results for "ptosis surgery" had the highest average score of 16.3, while the search results for "droopy eyelid diagnosis" had the lowest average score of 13.8. The GQS scored the highest at an average of 3.25 points for the keyword combination "ptosis surgery" and the lowest at 2.25 points for the keyword combination "droopy eyelid diagnosis."

Table 5. Comparative Analysis Based on Search Keywords.

	South Korean certified medical service providers (N)	Health care providers (N)	GQS	KMA scale
Ptosis Surgery	10 (50%)	18 (90%)	3.25 +- 0.85	16.3 +- 1.22
Ptosis Hospital	9 (45%)	17 (85%)	3.15 +- 0.88	15.75 +- 1.83
Ptosis Diagnosis	5 (25%)	17 (85%)	2.8 +- 0.89	15.4 +- 2.14
Droopy eyelid Surgery	2 (10%)	18 (90%)	2.8 +- 0.95	14.4 +- 2.84
Droopy eyelid Hospital	3 (15%)	19 (95%)	2.45 +- 0.89	14.85 +- 2.03
Droopy eyelid Diagnosis	1 (5%)	17 (85%)	2.25 +- 0.91	13.8 +- 2.44

Out of the total 76 videos, 39 were produced or involved plastic surgeons, 20 involved ophthalmologists, 5 involved dermatologists, and 11 were produced by professionals from other fields or general practitioners. There were 4 videos produced by non-medical creators (Table 6).

Table 6. Video Source of Upload.

Source of Upload	N
Plastic surgeon	39
Ophthalmologist	20
Dermatologist	5
Other medical professionals	11
Physical therapist	1
Non-professional	3

A comparison was made between the GQS and KMA's scale of South Korean certified medical service providers on YouTube (Table 7). The GQS for South Korean certified medical service providers showed an average of 2.93, and the KMA's scale was 15.27. For uncertified creators, the GQS score was 2.66, and the KMA's scale was 14.67, with no statistically significant difference. This was likely because even uncertified creators had videos involving medical professionals, as seen in the results.

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Table 7. A comparison between GQS and KMA scale.

	GQS	KMA scale
South Korean certified medical service providers	2.93 +- 1.03	15.27 +- 2.09
Uncertified creator	2.66 +- 0.95	14.67 +- 2.51
P-value	0.32	0.40
Specialists (Ophthalmologists, Plastic surgeons)	3.12 +- 0.66	15.47 +- 1.74
Non-specialists (general practitioners, dermatologists, and family medicine practitioners)	1.53 +- 0.64	13.33 +- 2.47
P-value	0.036	0.01

Additionally, a comparison was made between the GQS and KMA's scale scores of specialists (ophthalmologists and plastic surgeons) and non-specialists (general practitioners, dermatologists, and family medicine practitioners) (Figure1). There was a statistically significant difference in GQS scores (1.53 for non-specialists vs. 3.12 for specialists) and KMA's scale scores (13.33 for non-specialists vs. 15.47 for specialists) (P-value: GQS 0.036, KMA's scales 0.01).

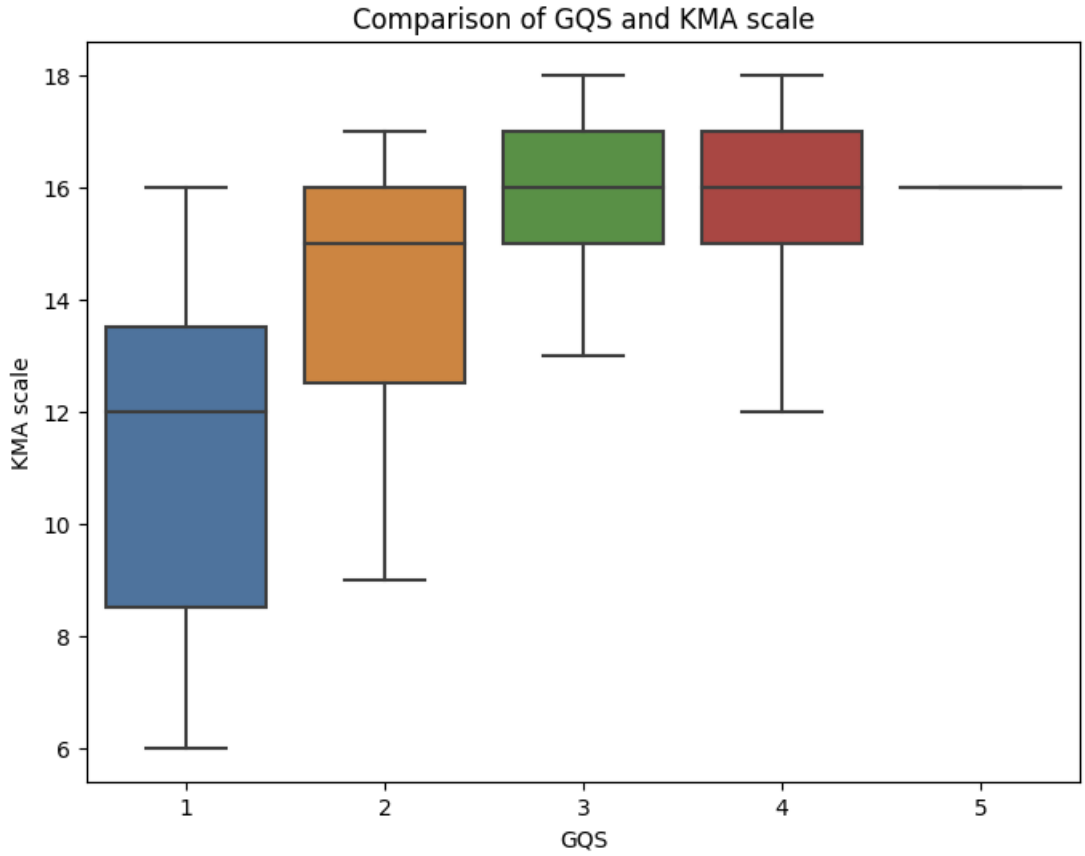

Figure 1. Comparison of GQS and KMA scale.

Discussion

The demand for information through social media is rapidly increasing, resulting in a surge in the quantity of information. [3,4] Therefore, verifying the accuracy of information is becoming increasingly important. Platforms like YouTube have greatly improved accessibility to medical information, but the increasing advertising costs have led to a proliferation of inaccurate information and one-sided opinions. [5,6] When videos are produced by South Korean certified medical service

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providers, there is a higher likelihood of the information having high reliability. However, there is also content produced without the involvement of medical professionals or without verification, and this necessitates concern about the reliability of such content. This problem has also been confirmed in other research results, such as a study that found YouTube lacks in providing sufficient information on topics related to dental pain. [9–13] In this study, 5% of the videos contained inaccurate information. This indicates that non-medical individuals may disseminate inaccurate medical information or post non-medical content for commercial purposes. This is also evident in videos produced by physical therapists and Pilates instructors, not to mention in videos produced by creators outside the medical field. However, some studies have shown that high-quality content does exist on YouTube, such as research on wrinkles using botulinum toxin A. [14] That's why it's important to have a standardized way to access quality content.

As observed in our study, the choice of keywords, such as 'ptosis' and 'droopy eyelid,' significantly influenced the ratio of certified medical service providers in the search results (80% for 'eyelid ptosis' and 20% for 'droopy eyelid'). Therefore, users are encouraged to make diligent efforts in selecting precise keywords. Patients may find it crucial to use accurate medical terminology when searching for information related to specific medical conditions or symptoms. Content creators, in turn, should prioritize the inclusion of commonly used medical terms when registering keywords for their content.

Two evaluation tools, the KMA's scale and the GQS, were used in this study. The Korean Medical Association's Internet Health Information Certification Standards have a total of 20 items, including 7 criteria for website reliability, 5 for format evaluation, and 8 for content evaluation. Scientific reliability evaluation criteria are applied to 6 specific sub-items, while the remaining 19 items are evaluated using a "yes" or "no" rating system, for a total maximum score of 24 points. This tool provides a detailed breakdown of the criteria, accompanied by appropriate annotations, to facilitate accurate evaluations. It should be noted, however, that the scoring process is time-consuming.

The Global Quality Score is primarily a tool used to assess the educational quality of content. It is rated on a scale from 1 to 5, with a maximum score of 5 indicating high-quality videos. This tool offers an intuitive and efficient evaluation process, making it a popular choice for assessing YouTube videos in many studies. [15,16]

In this study, the GQS and KMA's scale scores of uncertified creators were lower than those of certified medical service providers in Korea, although no statistically significant differences were observed. This suggests that even uncertified creators can produce videos of high credibility when medical professionals are involved. However, we analyzed the differences between the GQS and KMA's scales in content produced by ophthalmologists, plastic surgeons, and non-specialists. Significant differences were found. Currently, blepharoplasty is one of the procedures performed by many non-specialists in South Korea. In particular, related plastic surgeries such as double eyelid surgery are easily accessible to general practitioners. However, most of the information and resources related to these non-specialist procedures are predominantly commercial and advertisement-focused content. As a result, users receive one-sided information. To address this issue, it is essential to establish methods that provide access to quality information and resources.

The GQS and KMA's scales used in this study did not show statistical significance, but they generally showed a tendency to agree. (Fig 1.) The KMA's scales, which was developed primarily for evaluating internet sites, evaluates 20 items related to reliability, format, and content. It requires more time to complete than the intuitive GQS, and opinions may vary among raters. However, from the perspective of evaluating quality content, it is worth noting that content with a high score on one side tends to have higher scores on the other side.

The government and medical organizations should make additional efforts to manage and improve the quality and reliability of medical information provided on YouTube and other online platforms. It is essential to establish criteria and guidelines for the involvement of medical professionals and for verifying the accuracy of information. In addition, providing self-regulatory tools for reporting can encourage content creators to act responsibly. In particular, this study

identified one piece of harmful content that had accumulated 166,563 views, suggesting the need for swift sanctions. The role of YouTube as a channel to share medical information and provide educational content will continue to expand. Therefore, it is important to focus on verifying and increasing the reliability of medical information. To address this, not only doctors but also other healthcare professionals should participate, and efforts should be made to encourage hospitals to participate more actively in sharing information. Furthermore, the quality and reliability of the content shared on YouTube need to be improved.

Limitations

While this study provides results for specific keywords and platforms, further research is needed to cover a wider range of health topics and different platforms. Discussion and improvement of the evaluation criteria and scoring scales used in this study should also be considered. The scores were assigned based on the Korean Medical Association's criteria for certifying Internet health information, which primarily emphasize the source and scientific usefulness. Evaluating the accuracy of medical information would require a significant amount of time and expert involvement. In addition, the use of GQS for evaluation provides a simple 1-5 points scale and may benefit from more detailed evaluation criteria. The vast amount of information available online makes it challenging to secure sufficient resources for verification. Therefore, the development of simplified rating tools or the provision of certification marks or services by YouTube and similar platforms to content creators could generally improve reliability.

In addition, this study is based on search results in Korean, which may have limitations compared to videos produced abroad or in English. Information may be relatively scarce, and there may be country-specific limitations. Therefore, there is a need for standardized evaluation of videos in widely used English content. Although this study used GQS and KMA's scales, research using other tools such as DISCERN, Video Poser Index (VPI) score, and JAMA score is also feasible. [16–22]

Conclusions

Video platforms such as YouTube have improved access to medical information, but there is a need for caution regarding the reliability and quality of this information. Government agencies, medical organizations, and users need to work together to improve the quality of online health information. In particular, there is a need for mechanisms that allow for self-regulation to provide high-quality information. Users should also develop critical thinking skills and make an effort to seek out trustworthy information.

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Data Availability: This study did not involve the use of medical data or patients' information, and all data analyzed in this study were obtained from publicly available sources. The dataset used for this study can be directly accessed via YouTube (https://www.youtube.com/).

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