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Reliability and Quality of Korean YouTube Videos for Education Regarding Gout

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Conceptualization: Jun JB. Data curation: Koo BS, Kim D. Formal analysis: Koo BS, Jun JB.

ABSTRACT

Background: YouTube has become an increasingly popular educational tool and an important source of healthcare information. We investigated the reliability and quality of the information in Korean-language YouTube videos about gout.

Methods: We performed a comprehensive electronic search on April 2, 2021, using the following keywords—"gout," "acute gout," "gouty arthritis," "gout treatment," and "gout attack"—and identified 140 videos in the Korean language. Two rheumatologists then categorized the videos into three groups: "useful," "misleading," and "personal experience." Reliability was determined using a five-item questionnaire modified from the DISCERN validation tool, and overall quality scores were based on the Global Quality Scale (GQS).

Results: Among the 140 videos identified, 105 (75.0%), 29 (20.7%), and 6 (4.3%) were categorized as "useful," "misleading," and "personal experience," respectively. Most videos in the "useful" group were created by rheumatologists (70.5%). The mean DISCERN and GQS scores in the "useful" group (3.3 ± 1.0 and 3.8 ± 0.7) were higher than those in the "misleading" (0.9 ± 1.0 and 1.9 ± 0.6) and "personal experience" groups (0.8 ± 1.2 and 2.0 ± 0.8) ($P < 0.001$ for both the DISCERN and GQS tools).

Conclusion: Approximately 75% of YouTube videos that contain educational material regarding gout were useful; however, we observed some inaccuracies in the medical information provided. Healthcare professionals should closely monitor media content and actively participate in the development of videos that provide accurate medical information.

Keywords: Education; Gout; Patients; Rheumatologists

INTRODUCTION

Gout is a common disease among patients with inflammatory arthritis affecting between < 1% and 6.8% of the population.[1] Patients experience recurrent flares of pain due to deposition of monosodium urate crystals in the joints. In addition, various comorbidities such as cardiovascular disease and chronic kidney disease are frequently found in gout patients.[2,3] Therefore, long-term and active management is required for these patients.[4,5]

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In the treatment of gout, the participation of both physician and nonphysician providers is helpful to optimize patient education, shared decision-making, and treat-to-target protocols.[6] In addition, since lifestyle and dietary management are important in the treatment of gout, the patient must be sufficiently informed about the disease. However, outside of treatment, the provision of information about diseases by physicians is quite limited. Thus, about three-quarters of patients have been reported as being influenced by materials acquired by searching for health information online.[7-9]

YouTube is increasingly being used as a platform for disseminating health information.[10] In the past, people tended to consume information about diseases in text form, but with an increase in Internet usage, a lot of information is being disseminated through video-sharing platforms.[11] These platforms have the potential to serve as important vehicles for sharing and disseminating information, both as repositories of videos and as social networking interfaces where users can interact and socialize.[10] In Korea, the number of users of the YouTube app in September 2020 was 43.19 million (83%), out of 51.78 million mobile smartphone owners.[12] The average time spent per person on the YouTube app was 29.5 hours per month, higher than Facebook (11.7 hours) and Instagram (7.5 hours).[12]

However, since anyone can create and provide healthcare information through YouTube, there are concerns about the accuracy and quality of this information.[10] A previous study conducted a quality analysis of YouTube videos about gout in the English language.[13] However, just as the prevalence and risk factor of gout differ by region, the contents of YouTube videos may also differ from region to region. Therefore, the purpose of this study is to investigate the reliability and quality of Korean-language YouTube videos about gout.

METHODS

We created a new account on YouTube (http://www.youtube.com) in South Korean on April 2, 2021, and performed a comprehensive electronic search using the following keywords: gout (통풍), acute gout(급성 통풍), gout arthritis(통풍 관절염), gout treatment(통풍 치료), and gout attack(통풍 발작) in the Korean language. For each keyword, 60 videos that appeared in the search results were selected. In the past, YouTube listed 20 videos per page, and most users reported viewing up to three pages of search results.[14] Therefore, various studies have used 60 videos, which corresponded to search results of up to three pages.[13-16] As YouTube currently has an infinite scroll search system, it is difficult to use this method, but for comparison with previous studies, we used the first 60 videos per search term for the current study.

The videos were sorted by "relevance," which is the default sorting option. Non-Korean, irrelevant, or duplicate videos were excluded. The top 140 Korean videos on the subject were then arranged in a continuous list (**Supplementary Table 1**). Ethical approval was not required as this is neither a human or animal study.

The text descriptions of the videos were used to obtain the upload date and play time, as well as the number of views, likes, and dislikes. The contents of the videos were studied and used to categorize the videos according to source: five categories were used, including academic institutions/professional organizations, physicians, health information websites, healthcare professionals other than physicians, and independent users. Presenters were categorized

into seven classes, including rheumatologist, orthopedist, physician, pharmacist, oriental medicine doctor, broadcaster, and independent YouTube creator.

Evaluation of reliability and quality

All videos were independently evaluated by two reviewers (BSK and DK) after a consensus meeting. First, we evaluated the usefulness of the video.[13,15,17] Videos were classified as falling into one of three categories: useful, misleading, or personal experience. "Useful" constituted videos that provided medically and scientifically accurate information for gout, such as causes, symptoms, treatment, prognosis, and the like. "Misleading" was used for videos that gave incorrect or unproven information about gout. Finally, "personal experience" corresponded to videos describing a personal experience or feelings regarding gout.

Reliability and quality were determined using a five-item questionnaire modified from the DISCERN validation tool, and overall quality scores were based on the Global Quality Scale (GQS).[13,15,17,18] The modified DISCERN tool and GQS developed by Singh et al.[15] are presented in **Supplementary Table 2**. The DISCERN tool consists of five items, and each item can be answered as either "yes" (1 point) or "no" (0 points)[15]: 1) Are the aims clear? 2) Is the information from reliable sources, 3) Is the information presented balanced and unbiased? 4) Does it provide details of additional sources and information? and 5) Are areas of uncertainty mentioned? The higher the total points, the higher the reliability. The GQS was used to evaluate the videos with a five-point scoring system: 1-poor, 2-generally poor, 3-moderate, 4-good, and 5-excellent quality.

Statistical analysis

The inter-class correlation coefficient (ICC) was determined as a measure of agreement between the two rheumatologists who rated YouTube videos. All values are presented as medians (interquartile range) or number (%). Comparison of clinical characteristics was performed using the Kruskal-Wallis test for continuous data, and the χ^2 test for categorical data. A P value of 0.05 or less was considered as statistically significant. Statistical analyses were performed using R software version 3.6.1 (R Foundation for Statistical Computing, Vienna, Austria).

RESULTS

Agreement of quality evaluation

In order to check agreement, 140 videos in the Korean language were independently evaluated by two reviewers (**Fig. 1**). There was good agreement between DISCERN and GQS scores. The ICCs were 0.89 (95% confidence interval [CI], 0.85–0.92) for DISCERN and 0.85 (95% CI, 0.79–0.89) for GQS.

Usefulness of YouTube

Among the 140 selected YouTube videos, the categories "useful," "misleading," and "personal experience" accounted for 105, 29, and 6 videos, respectively (**Table 1**). Regarding video source, health information websites were the most common with 63 videos (45.0%). Health information websites also accounted for the highest number of useful videos with 58 (55.2%). Independent users had the highest number of misleading (15) and personal experience (3) videos, with 51.7% and 50.0%, respectively. Among all the videos, rheumatologists (74) accounted for 52.9% of presenters, and all these videos fell into the useful category. In
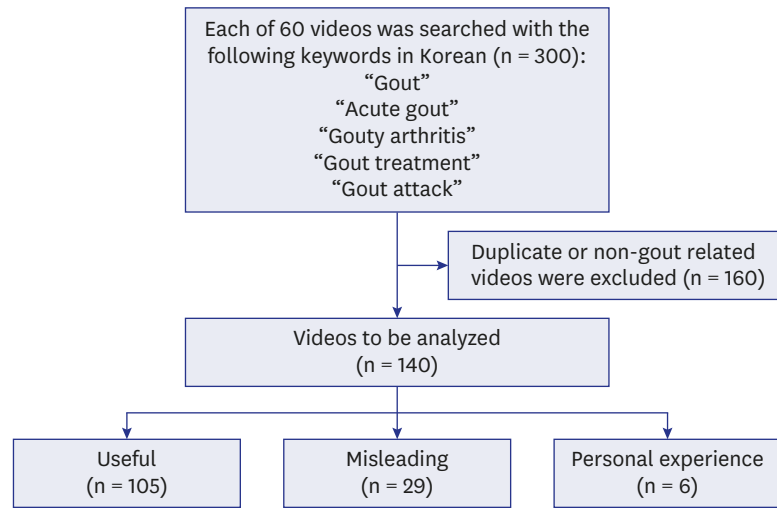
Each of 60 videos was searched with the following keywords in Korean (n = 300):
"Gout"
"Acute gout"
"Gouty arthritis"
"Gout treatment"
"Gout attack"

→ Duplicate or non-gout related videos were excluded (n = 160)

Videos to be analyzed (n = 140)

Useful (n = 105)　　Misleading (n = 29)　　Personal experience (n = 6)

Fig. 1. Study flow.

addition, 74 (70.5%) of all useful videos were presented by rheumatologists. However, nine (31.0%) videos from pharmacists were in the misleading group, and four (66.7%) videos from other YouTube creators were in the personal experience group (**Supplementary Fig. 1**). The number of views was highest in the personal experience group, whereas the numbers of both likes and dislikes were highest in the misleading group. In addition, there were differences between the three groups in terms of likes per view and dislikes per view ($P = 0.016$ and $P = 0.018$, respectively). DISCERN and GQS scores were highest for the useful group (3.3 ± 1.0 and 3.8 ± 0.7, respectively) when compared to videos in the misleading and personal experience groups.

Table 1. Difference of variables according to usefulness

Variables	Total (n = 140)	Useful (n = 105)	Misleading (n = 29)	Personal experience (n = 6)	P value
Video source					< 0.001
Academic/professional	16 (11.4)	15 (14.3)	0 (0.0)	1 (16.7)	
Health information websites	63 (45.0)	58 (55.2)	4 (13.8)	1 (16.7)	
Healthcare professionals	3 (2.1)	0 (0.0)	3 (10.3)	0 (0.0)	
Independent users	21 (15.0)	3 (2.9)	15 (51.7)	3 (50.0)	
Physicians	37 (26.4)	29 (27.6)	7 (24.1)	1 (16.7)	
Presenter					< 0.001
Broadcaster	8 (5.7)	5 (4.8)	3 (10.3)	0 (0.0)	
Oriental_medicine_doctor	3 (2.1)	0 (0.0)	3 (10.3)	0 (0.0)	
Orthopedist	12 (8.6)	11 (10.5)	0 (0.0)	1 (16.7)	
Pharmacist	10 (7.1)	1 (1.0)	9 (31.0)	0 (0.0)	
Physician	20 (14.3)	12 (11.4)	7 (24.1)	1 (16.7)	
Rheumatologist	74 (52.9)	74 (70.5)	0 (0.0)	0 (0.0)	
Other YouTube creators	13 (9.3)	2 (1.9)	7 (24.1)	4 (66.7)	
Length of time uploaded (day)	440.0 (277.0–866.0)	395.0 (278.0–883.0)	543.0 (276.0–847.0)	538.0 (134.0–954.0)	0.702
Playtime (min)	5.9 (3.3–11.4)	5.8 (3.2–12.8)	6.0 (5.1–7.9)	6.6 (2.1–16.7)	0.967
Views	2,808.5 (486.0–17,781.5)	1,880.0 (243.0–12,728.0)	10,515.0 (2,579.0–37,735.0)	1,570.0 (420.0–8,150.0)	0.01
Likes	45.5 (6.5–183.5)	27.0 (4.0–163.0)	154.0 (71.0–1,073.0)	51.5 (13.0–75.0)	< 0.001
Dislikes	2.0 (0.0–9.0)	1.0 (0.0–6.0)	7.0 (2.0–21.0)	0.5 (0.0–3.0)	0.001
Likes per views	1.3 (0.7–2.1)	1.1 (0.7–1.9)	2.0 (1.2–3.0)	2.0 (0.6–3.2)	0.016
Dislikes per views	0.0 (0.0–0.1)	0.0 (0.0–0.1)	0.1 (0.0–0.1)	0.0 (0.0–0.0)	0.018
Likes per dislikes	14.0 (4.6–28.0)	11.5 (3.9–25.0)	23.7 (19.3–34.1)	15.9 (14.0–18.0)	0.006
DISCERN	3.0 (1.0–4.0)	4.0 (3.0–4.0)	1.0 (0.0–1.0)	0.0 (0.0–1.0)	< 0.001
GQS	4.0 (2.0–4.0)	4.0 (3.0–5.0)	2.0 (2.0–2.0)	1.5 (1.0–2.0)	< 0.001

Values are presented as median (interquartile range) or number (%).
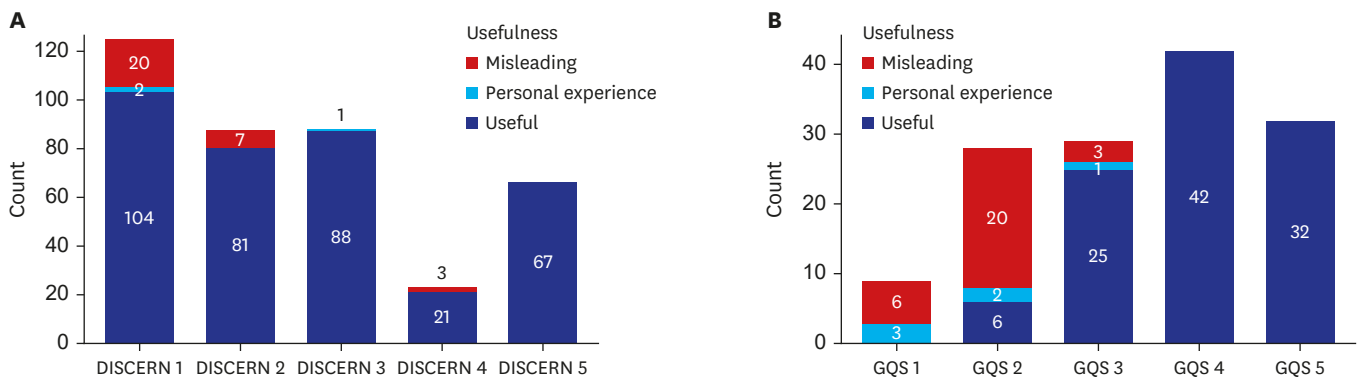DISCERN = The 5-point DISCERN tool, GQS = The 5-point Global Quality Scale.

Fig. 2. Number of videos for each item in DISCERN (**A**) and number of videos for each item in GQS (**B**).
DISCERN = The 5-point DISCERN tool, GQS = The 5-point Global Quality Scale.

Analysis of each item of DISCERN and GQS

In terms of the DISCERN results (**Fig. 2A**), most videos had a clear aim and were able to achieve it (DISCERN 1). Among the total set of videos, 88 (62.8%) used reliable sources, and 89 (63.6%) (DISCERN 2) provided balanced and unbiased information. However, only 24 (17.1%) videos listed additional sources of information for patient reference (DISCERN 4). A total of 67 (47.9%) videos mentioned areas of uncertainty in the field (DISCERN 5), and they all belonged to the useful group.

In terms of GQS (**Fig. 2B**), GQS 1 only consisted of videos from the misleading (3 [33.3%]) and personal experience (6 [66.6%]) groups. GQS 2 mainly comprised videos from the misleading group (20 [71.4%]), but GQS 3 was largely occupied by videos from the useful group (25 [86.2%]). GQS 4 (42) and GQS 5 (32) consisted only of videos from the useful group.

Distribution of playtime and views by usefulness

We analyzed text descriptions of the 140 YouTube videos to determine which features corresponded to the useful, misleading, and personal experience groups. Regarding the relationship between playtime and views (**Fig. 3**), the misleading group had several videos with short playtimes (all within 25 minutes) and high numbers of views. The sources of the misleading group were mostly independent users, physicians, and health information websites. However, the sources of videos in the useful group were health information websites, physicians, and academic/professional, and many of their videos had long playtimes. In other words, compared to videos that had many experts as sources, videos made by individuals had relatively short playtimes and a large number of views. In addition, the length of time uploaded on YouTube of misleading videos was not long compared to that of useful videos (**Supplementary Fig. 2**). **Supplementary Fig. 3** shows a histogram of likes per view (%) against usefulness. Most videos had a likes-per-view ratio of less than 10%. In the useful group, except for one video, videos with academic/professional and health information website sources received a likes-per-view ratio of less than 10%. In other words, both the useful and misleading groups had similar favorability from viewers.

DISCUSSION

In order to obtain health information about gout, many people turn to YouTube videos as easily accessible sources of information. Due to the large amount of freely uploaded content
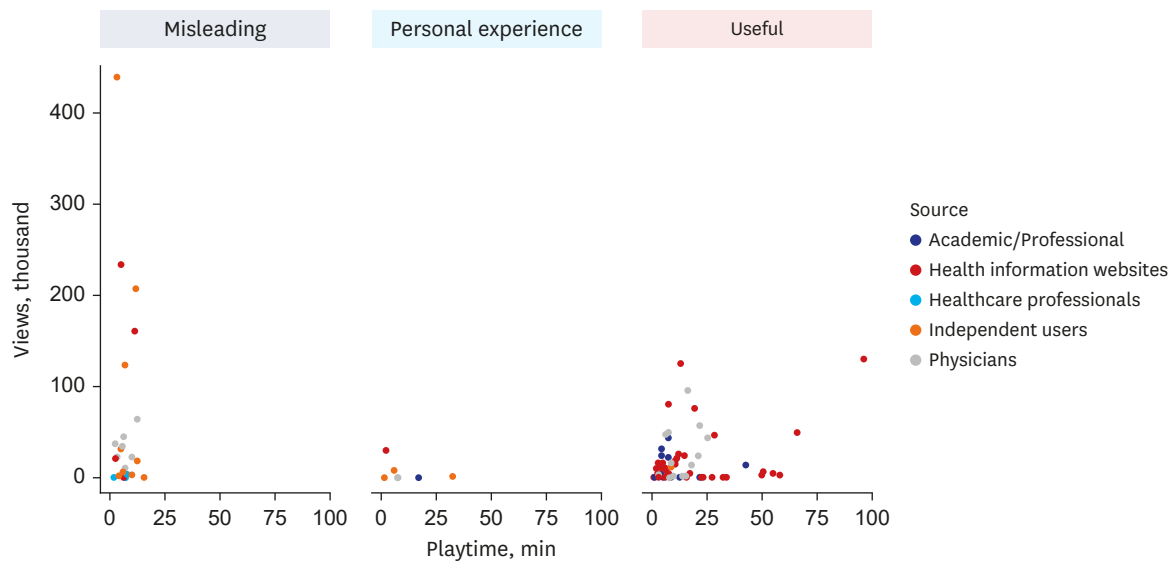
Fig. 3. Relationship between playtime and views according to usefulness.

on the platform, we felt that a professional evaluation of the content of these videos was necessary, especially concerning their accuracy and reliability. We reviewed 140 YouTube videos about gout to analyze their quality and reliability. We confirmed that 75.0% of videos could be perceived as being useful. However, 20.7% of videos could be considered as being misleading, and these tended to receive more views than those in the useful group. Our study is the first to analyze videos about gout in the Korean language, and the results show notable differences from studies on English-speaking videos.

Previous studies have explored the reliability and quality of information about gout in English-speaking YouTube video viewing regions.[13] Among the 114 videos, the researchers found that 100 (87.72%) fell into the useful group, and 14 (12.28%) could be considered misleading. The median (min–max) of DISCERN and GQS scores were 3.0 (1.0–5.0) and 4.0 (1.0–5.0) in the useful group and 2.0 (1.0–4.0) and 2.0 (1.0–4.0) in the misleading group. Their study also found a high proportion of physicians among the sources (36.8%). In comparison, our study found a high representation of health information websites (45.0%) among the sources and of rheumatologists (52.9%) among the presenters. It appears that in Korea, many YouTube videos related to gout are produced for health information websites, and many rheumatologists are involved in the production.

We also studied the metadata and text descriptions of the videos for additional information. The fourth item of the DISCERN questionnaire asks whether additional sources of information are listed for patient reference, and this is not the case in a large number (82.9%) of videos. It appears that even health information websites and rheumatologists are prone to overlooking this aspect of information dissemination. The relationship between playtime and views is also interesting. Although there was no correlation between playtime and views, all the videos in the misleading group had short playtimes, and some had very high views. Videos in the useful group received much fewer views than those in the misleading group. This suggests that while the videos being produced by health information websites are indeed useful, they are struggling to attract viewers on YouTube.

Although gout is a common and curable form of chronic inflammatory arthritis, there are barriers to effective care.[19] A minority of gout patients do receive effective treatment, such as lifestyle advice and uric acid lowering therapy. However, the majority continue to have recurrent attacks and are at risk of further joint damage and other complications. One possible reason for inadequate and insufficient treatment may be the significant gap in knowledge about gout and its treatment between the general public and healthcare professionals[19,20]; although healthcare providers may assume patients understand how to effectively manage gout, in fact, they may not. For example, patients who were interested in knowing how to manage an acute attack of gout knew that allopurinol reduced serum uric acid levels but lacked knowledge about the cause of the disease and the duration of treatment.[20-22] To bridge this gap and improve the quality of care in the treatment of gout, patient education is a key factor.[20,22] Healthcare providers recommend using written educational handouts, but patients may want a combination of verbal and printed information and advice.[22] YouTube videos have emerged as an informational tool in this regard. Therefore, easy-to-understand and interesting videos that have been verified by experts can be effective for meeting the needs of both patients and healthcare providers.

YouTube is a platform where anyone can freely share videos. Health-related information that is difficult to access can be easily communicated through these videos, which may be produced not only by independent creators but also by media companies, government agencies, and professional groups. Although our findings show a high proportion of useful information, inaccurate information is also present. Incorrect health information can pose a significant health hazard, so professional reviews may be required. However, it is impossible to moderate all videos on the platform, and the free sharing of videos is an important aspect of YouTube's model. It can also be problematic for experts to impose restrictions on videos, not to mention the impracticality of individually reviewing hundreds of videos. Therefore, it is important for viewers to be attentive and discerning. Information should be considered after taking into account whether the producers of a video present an unbiased view, provide enough references, and speak sufficiently about areas of uncertainty and the limitations of their assertions.[18]

Most of the videos classified as misleading conveyed misinformation about the cause of the disease, the food associated with an acute attack, and treatment. Gout's pathogenesis is the domain of experts, so it is necessary to distribute information about the causes of gout that can be easily understood by the general public. Information on foods related to acute attacks can also cause confusion because gout-related food information that reflects Korea's unique eating habits is not available. Further, some commercial videos have been produced that tout various unproven food and medications associated with gout treatment. Therefore, it is urgent that gout experts in Korea develop guidelines to prevent gout attacks that include behaviors associated with daily life along with medical treatment.

This study has several limitations. First, we selected and reviewed videos using the default sorting algorithm of the YouTube search tool. It is highly likely that the results favored videos preferred by YouTube viewers. To counter this, we reviewed as many gout-related videos as possible. Second, although DISCERN and GQS have been widely used to evaluate the credibility or quality of YouTube videos, these tools can be affected by reviewer bias. Therefore, it is necessary to develop an objective evaluation index that can increase the accuracy and reliability of healthcare information. Third, since the authors of this study are all rheumatologists, videos with a rheumatologist as a presenter might be considered a useful category. However, we rated the video using indicators such as DISCERN and GQS. Fourth, search results may

vary depending on the account conducting the search; because we created a new account, we cannot be sure that other accounts with an already-established YouTube history would see the same search results. Therefore, the results of this study cannot be generalized for all YouTube users in Korea. Fifth, adolescents or young adults spend more time on the YouTube app when compared to middle-aged people.[12] Considering that gout is a disease with a high prevalence in middle-aged men, the reliability of the numbers of views, likes, and dislikes can be questioned. Therefore, we focused our analysis on the usefulness of the contents of the video.

In conclusion, we found that 75.0% of the YouTube videos related to gout in the Korean language were useful. However, 20.7% of our selected videos may be considered misleading, and they have received a high number of views, which may be problematic for the diagnosis and treatment of gout patients. Reliable information delivery related to gout is crucial, and active participation and review by physicians and rheumatologists is required.

SUPPLEMENTARY MATERIALS

Supplementary Table 1
Links to 140 videos

Click here to view

Supplementary Table 2
The modified DISCERN tool and GQS

Click here to view

Supplementary Fig. 1
Number and ratio of presenters according to usefulness. The size of the rectangle indicates the ratio of presenter among all videos.

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Supplementary Fig. 2
The relationship between length of time uploaded and views for YouTube videos.

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Supplementary Fig. 3
Distribution of likes per view according to usefulness.

Click here to view

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