

Research Article

Scientific Quality and Reliability Analysis of Turkish YouTube Videos on Cancer and Nutrition

Elif Şahin,¹ Duygu Bayır Garbioğlu²¹Department of Medical Oncology, Kocaeli City Hospital, Kocaeli, Türkiye²Department of Medical Oncology, Zonguldak Bulent Ecevit University, Zonguldak, Türkiye

Abstract

Objectives: YouTube, boasting an expansive number of users, is one of the primary sources of video-based educational content worldwide. The aim of this study was to assess the content of YouTube videos about cancer and nutrition.

Methods: In this cross-sectional register-based study, popular videos on YouTube about the following keywords were evaluated; "cancer and nutrition", "nutrition in cancer patients", "chemotherapy nutrition", "nutrition in chemotherapy", and "nutrition after chemotherapy". and reliability of video content were measured using the Global Quality Score (GQS), Journal of the American Medical Association (JAMA), and the modified DISCERN (mDISCERN) tool.

Results: A total of 136 videos were analyzed in the study. The median duration was 157 (30–2960) seconds and the median number of views was 1232.5 (9–1238570). Median viewing rate was 1.06 (0–732). Among the video publishers, television (TV) health programs were the most (n=42, 31%). Regarding the video category, the most (n=121, 89%) popular was informative videos for patients. In most of the videos, the narrators were non-oncology clinicians (n=41, 30%) and dietitians (n=40, 29%). Mean GQS, JAMA, mDISCERN scores were 2.25±0.95 (fair-poor quality), 1.65±1.89 (fair-poor quality), and 1.96±1.13 (poor quality), respectively. A positive correlation was found between the 3 scoring points (p<0.001 for all pairwise comparisons). There was a negative correlation between video age, duration and all of the quality scores. There was a significant difference between video quality scores according to video categories, publishers and narrators (p<0.001 for each).

Conclusion: Patients and individuals who are curious about relationship between nutrition and cancer to access accurate information, individuals should be directed to the right resources. Making oncologists more visible in this field by receiving professional support and can help higher quality videos reach the public.

Keywords: Cancer, nutrition, YouTube, Global Quality Score (GQS), modified DISCERN scoring

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Cancer continues to be a leading cause of mortality and challenging public health problems worldwide.^[1] In recent years, the complex interaction between cancer and nutrition has emerged as a prominent area of discussion, with a growing body of evidence highlighting the important role of dietary habits in the etiology, prevention, and treatment of various types of cancer. As researchers delve

deeper into the complex molecular and metabolic mechanisms involved, understanding the nuanced relationship between dietary patterns, nutrient intake, and cancer risk has become a focal point in the multifaceted battle against this challenging disease.^[2,3] Besides researchers, the public has a great interest in the relationship between cancer and nutrition. While healthy people are interested in this issue

Address for correspondence: Elif Şahin, MD. Department of Medical Oncology, Kocaeli City Hospital, Kocaeli, Türkiye

Phone: +90 506 808 08 67 **E-mail:** dr_elifsahin48@hotmail.com

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to protect themselves from cancer, cancer patients and their relatives are investigating this issue to prevent recurrence or progression.

After professionals and public health groups, the internet has eclipsed traditional mass media as the third most trustworthy source of health information.^[4] The widespread use of social media platforms globally has led to a parallel increase in the dissemination of health-related information, including cancer.^[5] Among these platforms, YouTube, boasting an expansive user base of over 2 billion individuals, stands as one of the primary sources for video-based educational content worldwide.^[6]

Online materials are frequently not subject to sufficient quality control procedures, and some publicly available videos have the potential to mislead patients and disseminate misleading information.^[7] Therefore, assessing the quality and credibility of YouTube videos addressing the link between cancer and nutrition is critical in light of the platform's widespread accessibility and potential impact on public perception and health decision-making. The purpose of this study is to assess the scientific validity, substance, and quality of Turkish YouTube videos about nutrition and cancer by using globally recognized scoring tools.

Methods

At the beginning of this cross-sectional study, conducted on 29.07.2023, 'Google Trends', a free tool that determines the popularity of Google search terms, was used to decide the keywords to search. 'Cancer and nutrition' was typed into the search box in Turkish and the 'most relevant' keywords were accessed by adjusting the search settings in all categories, Google web search and YouTube search, worldwide, since 2004. Two oncologists came to an agreement on the most popular 5 keywords in Google Trends: "cancer and nutrition", "nutrition in cancer patients", "chemotherapy nutrition", "nutrition in chemotherapy", and "nutrition after chemotherapy". Then, on the same day, a fresh Google and YouTube account was created to prevent any potential bias brought on by customized algorithms, and a search for these terms was carried out online on YouTube using the typical Turkish search preferences. "Order videos by relevance" remained the website's default search setting, all cookies were deactivated, and all advertisements were excluded. Since 95% of internet searchers only look at the first three pages of results, and YouTube has 20 videos per page; the 60 most popular videos for each keyword were examined. Selected 300 videos have been added to a new YouTube library database for further evaluation. We only included Turkish-speaking videos. In addition, videos shorter than 30 seconds, videos longer than 1 hour, videos without sound, recurrent videos, re-

stricted videos, and irrelevant videos, were not included in the study. The rest of the videos were included. All these preliminary preparations were carried out separately by two medical oncologists.

In the next stage of the research, two oncologists watched and scored the videos on the YouTube library blind to each other. Source, narrator, upload date, content category, duration (seconds), total number of views, comments, likes, and scores from the each quality scale were recorded separately by both clinicians. Video age (number of days between upload date and 29.07.2023) and view rate (views/video age) were calculated. After all videos were watched, the scores of the videos were compared. Videos that were evaluated differently by two oncologists were re-evaluated together. If both oncologists did not want to change their scores, the scores were averaged and recorded.

According to the publishers, the videos were divided into eight categories: oncology specialists, dietitians, private hospitals, foundations/ associations, academic institutions, television channels, health channels/websites, and other independent channels. The videos' material was divided into four categories: patient experience, patient education, advertisement, healthcare professional education.

The Global Quality Score (GQS), the Journal of the American Medical Association (JAMA) tool, and the modified DISCERN (mDISCERN) grading system were used to assess the quality and dependability of video material. The GQS is a tool that subjectively rates the overall quality of video material on a scale of 1 to 5. The JAMA score, on the other hand, is a quality evaluation tool that may be used to grade the accuracy and trustworthiness of medical information on the internet. This scale assigns points based on four criteria: authorship, attribution/references, explanation/ conflict of interest, and validity. The lowest possible score is zero, and the greatest possible score is four. The mDISCERN scale is a 5-point Likert scale modified from a test intended to assess textual health information. This measure assigns a score of 0 or 1 based on precision/clarity, reliability, balance, source, and uncertainty, with higher values indicating better dependability.

This study evaluated publically available YouTube videos, thus no human participants or animals were included in the study. As a result, ethical clearance has been waived, as with prior YouTube investigations.

SPSS software version 22.0 (IBM Inc., Armonk, NY, USA) was used to analyze the data. Prior to the study, the repeatability of every scores was verified. The intra-class correlation coefficient, which is a tool used to evaluate inter-rater reliability, was used to evaluate inter-oncologist reliability. For categorical variables, descriptive statistics were presented as counts (percentages), and for continuous variables, the

median (25-75 percentile for scorings and minimum-maximum for others) or mean±standard deviation. The normality distribution of each continuous variable was investigated using the Kolmogorov Smirnov test. The chi-square test was carried out to compare categorical variables, the Mann-Whitney U test to compare variables in 2 independent groups, and the Kruskal-Wallis test to compare variables in ≥2 independent groups. The Bonferroni correction was used for verification, and the Spearman correlation test was used to examine the correlations between variables. A type-I error level of 5% ($p < 0.05$) was adopted as the statistical significance criterion.

Results

A total of 300 videos were analyzed and the videos that met the exclusion criteria were deleted from the YouTube video library. One hundred and thirty-six videos were analyzed by two medical oncologists (ES and DBG). The GQS, JAMA,

and mDISCERN scores of the evaluators were found to be in strong agreement with an intraclass correlation coefficient value of above than 0.90.

All videos except 3 (%2) were published in Turkey. Among the video publishers, television (TV) health programs were the most ($n=42$, 31%). Regarding the video category, the most ($n=121$, 89%) popular was informative videos for patients. Most narrators in the videos were non-oncology physicians ($n=41$, 30%) and dietitians ($n=40$, 29%). The descriptive characteristics of the videos were summarized in Table 1.

Of the total 136 videos evaluated, 120 (88%) were classified as useful, as 16 (12%) contained incorrect information. While all 3 (2%) of the harmful videos were patient experience videos, the others (10%) were patient information videos on health programs on TV.

GQS, JAMA, and modified DISCERN scores were significantly different between publishers ($p < 0.001$ for all of them). In pairwise comparisons, this significant difference in video quality was mostly due to the difference between videos conducted by TV channels and doctors' or private hospitals' channels ($p < 0.001$ and $p = 0.012$, respectively). While the total number of views [median: 2447.5 (60-1040647)] and number of likes [median 20.5 (0-5700)] of videos by TV channels were higher than the average, GQS (1.79 ± 0.75), JAMA (1.29 ± 0.89), and mDISCERN (1.45 ± 1.06) scores were found to be relatively low. Compared to other publishers, videos published by academic institutions had higher scores but lower interactions. Additionally, the duration of academical videos were significantly longer than others [median 2460 (164-2960) minutes, $p < 0.001$ for each pairwise comparison]. GQS, JAMA, and mDISCERN scores according to the publishers of the videos are summarized in Table 2.

Table 1. Characteristics of the videos on YouTube about complementary and alternative medicine and therapies

Characteristics	Mean±SD	Median (Min-Max)
Duration (second)	460.6±698.9	157 (28-2960)
Age (day)	1671.8±1161.9	1513.5 (24-4330)
Number of total views	36714.7±153216.2	1232.5 (9-1238577)
View ratio (number of views per day)	20.3±77.9	1.06 (0.01-732.9)
Number of likes	528.3±3178.1	19.25 (0-36000)
Number of comments	496.4±5439.3	0.88 (0-63000)
mDISCERN score	1.96±1.13	2 (0-5)
JAMA score	1.65±0.89	2.00 (0-4)
GQS score	2.25±0.95	2.00 (1-5)

SD: Standard deviation; JAMA: Journal of the American Medical Association; GQS: Global Quality Score.

Table 2. mDISCERN, JAMA, and GQS scores according to the publishers of the videos

Publishers	n (%)	mDISCERN	JAMA	GQS
Medical Doctor	34 (25)	2.38±1.19	2.0±0.92	2.62±1.01
Dietician	10 (7)	1.5±0.97	1.2±0.79	1.9±0.88
Independent user	7 (5)	1.0±1.0	0.86±0.69	1.57±0.79
Academic facility	5 (4)	3.0±1.0	2.40±0.55	3.0±1.0
Private hospital	19 (14)	1.84±0.6	1.63±0.5	2.16±0.6
TV program/news	42 (31)	1.45±1.06	1.29±0.79	1.79±0.75
Commercial company	5 (4)	3.00±1.16	2.25±0.50	3.23±0.96
Society/foundation	10 (7)	2.5±0.99	2.2±0.92	2.9±0.99
Health channels/websites	9 (7)	2.63±0.74	2.13±0.35	3.0±0.76
Total	136 (100)	1.96±1.13	1.65±0.89	2.25±0.95

The data has been represented as n (%) and mean±standard deviation. Abbreviations: mDISCERN, modified DISCERN score; JAMA, Journal of the American Medical Association; GQS, Global Quality Score.

A significant difference was seen in the GQS, JAMA, and mDISCERN scores between the different categories of the videos ($p=0.002$, $p=0.004$, $p=0.002$, respectively). The vast majority of the 'nutrition and cancer'-related videos on YouTube ($n=121$, 89%) were in the category of patient information. The interactions of these videos were moderate [median number of views: 1170 (14-1238577), median viewing rate: 1.02 (0.01-732.89), median number of likes: 13.5 (0-36000), median number of comments: 8 (0-1355)]. Informative videos for patients were also found to have moderate quality scores for GQS [2.3 ± 0.93], JAMA [1.7 ± 0.88], and mDISCERN [2.02 ± 1.12]. However, the duration of these videos was significantly shorter than the patient experience and medical education videos ($p=0.024$ and $p=0.002$, respectively). The GQS, JAMA, and mDISCERN scores regarding the category of the videos were shown in Table 3.

In 30% of the videos ($n=41$), the main narrators were non-oncology clinicians, and in 29% ($n=40$) they were dietitians. Oncology professionals were speaking in 24% ($n=33$) of the videos. There was a statistically significant difference between GQS, JAMA, and mDISCERN scores according to the video narrators ($p\leq 0.001$ for each). When the videos in which the narrator was not a physician, dietitian or patient were compared with the videos narrated by oncology physicians, non-oncology physicians or dietitians, the quality scores were significantly lower [(for GQS score $p=0.001$,

$p=0.013$, $p=0.001$, respectively) (for JAMA score $p<0.001$, $p=0.034$, $p=0.001$, respectively) (for mDISCERN score $p=0.002$, $p=0.033$, $p=0.002$)]. According to the narrators, no difference was detected in terms of video duration, viewing rate, number of views, number of likes and number of comments ($p=0.351$, $p=0.101$, $p=0.08$, $p=0.066$, $p=0.063$).

There was a correlation between GQS, mDISCERN, and JAMA scores ($p<0.001$ for all). There was a negative correlation between video age, duration and the quality scores. The correlations between GQS, JAMA, mDISCERN scores, and video ages, durations, number of likes, and viewing rate are as in Table 4.

Discussion

The correlation between nutrition and cancer has perpetually intrigued researchers and the public. Alongside identifying cancer-preventive or cancer-causing foods, numerous studies have emphasized the significance of nutrition in individuals undergoing cancer treatment.^[2] Several factors, including malnutrition, sarcopenia, and cachexia, are closely linked to nutrition, with evidence suggesting their impact on survival rates across various cancer types.^[8] Cancer patients who cannot get enough information about nutrition from health professionals are looking for different sources of information. In recent years, YouTube has been used as a source of information by cancer patients as well

Table 3. mDISCERN score, JAMA score, and GQS score according to the categories of videos.

Categories	n (%)	mDISCERN	JAMA	GQS
Patient information	121 (89)	2.02±1.12	1.7±0.88	2.3±0.92
Patient experience	5 (4)	0.6±0.55	0.6±0.55	1.4±0.55
Medical education	2 (2)	3.5±0.7	1.89±0.93	2.5±0.7
Advertisement	6 (4)	1.33±0.82	1.0±0.63	1.33±0.52
Total	108 (100)	1.96±1.13	1.65±0.89	2.25±0.95

The data has been represented as n (%) and mean±standard deviation (SD); Abbreviations: mDISCERN, modified DISCERN score; JAMA, Journal of the American Medical Association; GQS, Global Quality Score.

Table 4. Correlation between mDISCERN, JAMA, GQS scores and video age, duration, number of likes, and VR

	mDISCERN	JAMA	GQS	Age	Duration	Likes	VR
mDISCERN	-	$r = 0.883$	$r = 0.832$	$r = -0.236$	$r = 0.322$	$r = -0.214$	$r = -0.173$
		$p < 0.001$	$p < 0.001$	$p = 0.006$	$p < 0.001$	$p = 0.012$	$p = 0.044$
JAMA	$r = 0.883$	-	$r = 0.831$	$r = -0.177$	$r = 0.296$	$r = -0.021$	$r = -0.085$
	$p < 0.001$		$p < 0.001$	$p < 0.039$	$p < 0.001$	$p = 0.161$	$p = 0.323$
GQS	$r = 0.832$	$r = 0.831$	-	$r = -0.187$	$r = 0.331$	$r = -0.073$	$r = 0.050$
	$p < 0.001$	$p < 0.001$		$p < 0.029$	$p < 0.001$	$p = 0.398$	$p = 0.561$

Spearman correlation test was used to analyze the correlation and $p<0.05$ was considered statistically significant. Abbreviations: mDISCERN; modified DISCERN score; JAMA, Journal of the American Medical Association; GQS; Global Quality score. VR; Viewing rates.

as healthy people.^[5,7] However, studies have shown that the content of YouTube videos about health is not high in terms of scientific quality and reliability.^[9-11]

The current study evaluated the quality, credibility, and engagement of YouTube videos about cancer and nutrition. The mean mDISCERN score was 1.96 ± 1.13 (poor quality), JAMA score was 1.65 ± 1.89 (fair-poor quality), GQS score was 2.25 ± 0.95 (fair quality). The average view rate of the videos was 20.29 ± 77.86 (median 1.06, range; 0–732). The content of YouTube videos as a source of medical information has recently been the subject of several research.¹² Nonetheless, there were only a few study on cancer.^[8,13,14] This study is the first study that evaluated Turkish videos on 'cancer and nutrition', which is a popular topic.

Compared to the literature, our number of included videos was higher than many studies.^[8,15] This is expected to increase the reliability of our analysis. Most of the videos ($n=120$, 88%) were useful in our study. Similarly, in the study of Chai et al., YouTube videos were found to be generally useful.^[16]

YouTube does not display dislikes in a public manner at the time of this research. This made it impossible to calculate the video power index [(like count/dislike count + number of likes) X 100]. However, by examining the number of video views, viewing rate, likes, and comments, observations about engagement and consequent popularity may be produced.

Most of the videos in our study ($n=42$, 31%) were published by TV channels. Some of these videos contained false and misleading information. Additionally, the quality of the health programs on TV was low. However, their interactions were relatively high. References and directions to scientific sources were missing in the conversations. The reason for the high interaction of health videos on TV channels may be the use of popular video titles and eye-catching styles in these videos. The main purpose of these channels is generally to increase the number of views. Therefore, narrators suitable for this purpose are invited to speech. On the other hand, academic videos prioritize information as their main goal, so the quality of these videos was better, in line with other studies.^[17]

The vast majority of the 'nutrition and cancer'-related Turkish videos on YouTube ($n=121$, 89%) were in the category of patient information. The interactions and scores of these videos were moderate. These videos' durations were significantly shorter than the medical education and patient experience videos. It was probably due to preparing videos that were more planned, shorter and more concise to enable patients to focus their attention.

In most of the videos, the narrators were non-oncology

clinicians ($n=41$, 30%) and dietitians ($n=40$, 29%). When the videos in which the narrator was not a physician, dietitian or patient were compared with the videos narrated by oncology physicians, non-oncology physicians or dietitians, the quality scores were significantly lower [(for GQS score $p=0.001$, $p=0.013$, $p=0.001$, respectively) (for JAMA score $p<0.001$, $p=0.034$, $p=0.001$, respectively) (for mDISCERN score $p=0.002$, $p=0.033$, $p=0.002$)]. It was noticeable that non-oncologist medical doctors talk about cancer more than oncologists. This may be due to oncologists not being able to spare time for this in their busy work schedule. Or the style of speech they used may not have attracted the attention of the patients. Oncologists who are experts in this field should upload more informative videos using professional teams to increase the attractiveness of the videos.

Reviewing the literature, previous studies revealed that most cancer-related videos provide false information and the quality and reliability of the information in the videos is low.^[13,14,15,18] In our study where Turkish videos about cancer and nutrition on YouTube were analyzed; although the majority of the videos contained useful information, some of them contained incorrect information. Additionally, the quality and reliability of the video content was not high. Most videos were not inclusive. There were gaps in the information provided and most of the videos did not provide a reference to the information provided. Besides, there weren't many materials that made it obvious whether there was a conflict of interest and directed viewers to credible scientific sites for additional data.

Since cancer is a fatal disease, a misinformation that will negatively affect the effectiveness of cancer treatment can lead to fatal consequences. In addition, it may increase the possible side effects of treatments. The clinician providing detailed information to the patient and the presence of a health professional in every oncology center that cancer patients can reach at any time and ask their questions will prevent patients from seeking information from incorrect sources.

This study's strengths included selecting the top three most watched pages from each of the five trending keywords, utilizing three distinct scoring methods to analyze the quality and dependability, and having two oncologists evaluate the results independently and without mutual knowledge. Limitations of this study include the use of just Turkish-language videos, and 300 videos for analysis, the evaluation by only two oncologists, the evaluation of only standard-setting videos, and the exclusion of other widely utilized social media networks including Twitter, Instagram, and TikTok.

Conclusion

In the current study, using 3 separate quality scales, Turkish YouTube videos about cancer and nutrition found that they contained information of low quality and reliability. Although misinformation was rare, many videos lacked information and references and did not point to scientific sources. Most of the videos were published by TV channels. Many of them were educational videos for cancer patients, and most of them were narrated by non-oncology clinicians and dietitians. Some videos with high engagement were of significantly lower quality and contained misleading information. The 3 quality scales were correlated each other. Our study has shown that in order for cancer patients and healthy individuals who are curious about relationship between nutrition and cancer to access accurate information, individuals should be directed to the right resources. Making oncologists more visible in this field by receiving professional support can help higher quality videos reach the public.

Disclosures

Ethics Committee Approval: There were no human or animal participants in this study because it examined YouTube videos that were openly accessible. This investigation was also conducted outside of regular business hours. As in the case of earlier YouTube investigations, ethical clearance has been waived.

Peer-review: Externally peer-reviewed.

Conflict of Interest: None declared.

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