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ORIGINAL CONTRIBUTIONS

Assessment of the Quality and Reliability of Information on Nutrition After Bariatric Surgery on YouTube

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Abstract

Background YouTube™ is a platform that many people, including patients, use to access health information. Recent studies have revealed that videos on YouTube™ are misleading or that medical videos may not contain appropriate information. This study aimed to assess the quality and reliability of videos on nutrition after bariatric surgery.

Materials and Methods The keywords "after bariatric surgery diet" and "weight loss surgery postop diet" were used, and the first 100 videos for each keyword on YouTube™ were analyzed by considering the source, duration, content, and the number of likes of the video. The popularity of the video was calculated using the video power index (VPI) and view rate. The educational quality of the videos was evaluated using the DISCERN score, the Journal of the American Medical Association (JAMA) score, the Global Quality Score (GQS), the usefulness score, and a novel postoperation nutrition score (PONS).

Results One hundred fourteen patients were included in the study. The mean duration and number of views were 12.51 min and 87,558.46, respectively. The DISCERN score, JAMA score, GQS, and usefulness score of the physicians or dietician-based videos were significantly higher than those of the patient-based videos ($p < 0.001$). Positive correlations were found between the VPI and view ratio, as well as between the duration and number of likes. Additionally, the DISCERN score was significant correlated with the duration and number of likes. Significantly positive correlations were found between the usefulness score and duration, usefulness score and number of likes, and PONS and duration ($p < 0.01$).

Conclusions Informational videos on nutrition after bariatric surgery on YouTube™ are of low quality. Although the videos uploaded by physicians and dieticians have higher quality, only a few are available. Additionally, patients prefer to watch low-quality videos.

Keywords Internet · YouTube · After bariatric surgery · Patient education · Information · Quality video

Introduction

The internet is used as an information source worldwide, and 80% of those who have sought information online have consulted web sources for health information [1]. Because the videos on YouTube™ are considered the main source of information, this information exchange is expected to increase even more in the near future [2]. YouTube™ is the largest open-access video-sharing website with 300 h of videos uploaded per minute [3]. Additionally, YouTube™ videos

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have become a visual information source for medical students and surgeons. With the developments in technology, the advantages/disadvantages of information sharing and questionable quality of the videos have led to the emergence of a new "YouTube™ generation" concept [4–7]. Currently, patients are searching for medical information on YouTube™. However, incomplete and misleading information may present different challenges. Many studies have found that medical information including videos on YouTube™ contains misleading and inappropriate content [2, 8–10]. There is an important effect of low-quality videos on the patient-physician relationship. Thirty-eight percent of physicians believe that consultations have become less efficient due to the information gathered by patients from various sources that may affect patients' decisions [11].

In recent years, the prevalence rates of obesity and type 2 diabetes have increased. Additionally, the developments in surgical methods have elevated the number of bariatric surgeries worldwide [12]. The increased number of bariatric surgeries and physician interest in bariatric surgery has caused a significant rise in the number of shared bariatric procedures and bariatric nutrition in online channels, including YouTube™. This study aimed to assess the quality of the educational videos related to nutrition after bariatric surgery on YouTube™ and their potential contributions to their viewers. To our best knowledge, this study is the first in the literature to investigate this topic.

Materials and Methods

Study Design

A YouTube™ (https://www.youtube.com) search was conducted using the keywords of "after bariatric surgery diet" and "weight loss surgery postop diet" on February 18, 2020. The first 100 videos were used for each keyword using YouTube™ filters to rank all the videos by relevance [2, 9, 10], assuming that the users would not browse beyond the fifth page of results [2, 9]. Among these 200 videos, 49 were duplicate videos, 2 were non-English videos, 32 were non-nutritional videos, and 3 were removed videos. Video analysis was conducted by two researchers (NY and NB). These videos were analyzed immediately by two dieticians simultaneously.

The educational quality of the videos was evaluated using the DISCERN score, the *Journal of the American Medical Association* (JAMA) score, the Global Quality Score (GQS), the usefulness score, and a novel postoperation nutrition score (PONS).

The DISCERN questionnaire comprises 16 questions in 3 parts. Higher scores represent a better quality [13]. The first 8 questions are related to reliability, and the next 7 include detailed questions about treatment. The final question is a general evaluation question. In the DISCERN scoring system, 63–75 points indicate excellent quality, 51–62 points indicate good quality, 39–50 points indicate average quality, 27–38 points indicate low quality, and 16–26 points indicate very low quality.

JAMA scoring evaluates the quality of the videos according to 4 criteria (authorship, attribution, disclosure, and currency). In the JAMA evaluation, 1 point is insufficient information, 2–3 points are partially sufficient information, and 4 points represent completely sufficient information [14].

Bernard et al. first described the GQS, which evaluates the educational value of a video. It comprises 5 points: 1 point shows poor quality, 2 points show poor quality but contains some information, 3 points show suboptimal quality, 4 points show good quality, and 5 points show excellent quality [15]. The usefulness score was first described by Lee et al., and the videos are scored according to the information content as follows: 7–10 points, very useful; 3–7 points, useful; 1–2 points, useless [16]. Each criterion is scored, and the best quality is indicated by 3 points.

No specific measure is available to evaluate the quality of the nutrition information after bariatric surgery. Thus, a YouTube™-based postoperation nutrition score (PONS) system was designed based on the guidelines of the American Society for Metabolic and Bariatric Surgery (ASMBS) [17]. One point was assigned to each criterion with a 10-point maximum score (Table 1). The videos are grouped as excellent (7–10 points), average (4–6), and poor (1–3).

The videos were categorized according to their sources, such as a physician, dietician, commercial, or patient. Additionally, the videos were grouped according to the presence or absence of animation.

The video power index (VPI) and view ratio were used to determine the video popularity. The VPI was calculated using the equation [like ratio × view ratio/100], as described by Erdem et al., the ratio was calculated using the equation (like × 100/[like + dislike]), and the view ratio was calculated using the equation [number of views/time since upload] [8, 10]. Institutional review board approval was not required for the study.

Statistical Analyses

The SPSS 20 program was used to analyze the data. The frequency, percentage, minimum-maximum values, and means ± standard deviation were used to describe the data. The compliance with a normal distribution of all the data and within the group was tested using the Shapiro–Wilk test. The relationships between the variables were determined by Spearman's correlation. Comparisons between scores according to the video source were performed using the Kruskal–Wallis test. The Mann–Whitney *U* test was applied for a

Table 1 Postoperation nutrition score (PONS)

	Points
Dietary stages and duration	Max 1 point
Foods suitable for dietary stages	Max 1 point
Protein shake and the importance of the protein-rich diet	Max 1 point
Beverage consumption (water, carbonated beverage, coffee)	Max 1 point
Simple sugar restriction	Max 1 point
Water consumption	Max 1 point
Alcohol consumption	Max 1 point
What are the complex carbohydrates? Suitable foods	Max 1 point
Vitamin-mineral usage	Max 1 point
Regular follow-up	Max 1 point

significant difference between the groups. A p value less than 0.05 was considered statistically significant.

Results

One hundred fourteen videos were evaluated in this study, and descriptive statistics of the data are presented in Table 2.

According to DISCERN scoring, one video (0.9%) was excellent, six videos (5.3%) were good, fifteen videos (13.2%) were fair, fifty-four videos (47.4%) were poor, and thirty-eight videos (33%, 3) were very poor. According to PONS scoring, 6.1% of the videos were good, 40.4% were medium, and 53.5% were insufficient. When the video content was examined, 76% concerned patient experience, 14% were informative, 8.8% concerned nutrition education, and 2.6% were advertisements. The videos were 74.52% patient based, 22% physician based, 0.9% dietician based, and 2.6% commercial based.

The correlations between the data are shown in Tables 3 and 4. Regarding the sources of the videos, 74.6% were from patients, 21.3% were from physicians, 1% were from dieticians, and 3.1% were from advertisements. The DISCERN score, JAMA score, GQS, and usefulness score were significantly higher in physician- or dietician-based videos than in patient-based videos ($p < 0.001$). The PONS, video power index, and view ratio did not differ in terms of the video source ($p > 0.05$) (Table 3).

The VPI showed a significantly positive correlation with the view ratio (rho = 0.894; $p < 0.001$), duration (rho = 0.225; $p < 0.05$), and the number of likes (rho = 0.781; $p < 0.001$). The correlations between the DISCERN score and duration (rho = 0.214; $p < 0.05$) and the number of likes (rho = 0.224; $p < 0.05$) were significant. A positive relationship was observed between the GQS and duration (rho = 0.196; $p < 0.05$). Significantly positive correlations were found between the usefulness score and duration (rho = 0.241; $p < 0.001$), between the usefulness score and number of likes (rho = 0.214; $p < 0.05$), and between the PONS and duration (rho = 0.255; $p < 0.001$) (Table 4).

Discussion

The present study revealed that the most popular videos concerning nutrition after bariatric surgery on YouTube™ have the least academic and educational quality. In recent years, an increase in the daily number of patients consulting healthcare providers after researching on the Internet has attracted attention, and YouTube™ is a growing online video platform that provides easy access to videos. Its popularity is increasing among patients and the medical field [18]. Our study was conducted to evaluate the quality and reliability of YouTube™ videos concerning nutrition after bariatric

Table 2 Descriptive statistics of data

	Mean	Std. Dev.	Min.	Max.	Median
DISCERN	31.58	10.02	16	64	30.00
JAMA	2.25	0.97	1	4	2.00
GQS	2.35	0.98	1	5	2.00
USEFULNESS	3.10	1.90	1	8	2.00
PONS	3.59	1.82	1	10	3.00
Time since upload (days)	1433.77	810.19	206	4331	1140.00
Duration (min)	12.51	7.70	0.09	38.03	11.46
Number of views	87,558.46	204,287.73	13,861	1,959,902	34,867.0
Number of likes	1534.67	5106.24	0	46,065	518.50
Number of dislikes	56.98	139.67	0	1178	19.00
Number of comments	190.53	625.20	0	6216	61.00
View ratio	79.63	170.74	5.34	1513.44	32.46
VPI	71.32	163.46	0	1454.51	30.24

Table 3 Comparison of video sources and scores

Variable	Patient ($n = 85$)	Physician ($n = 25$)	Dietician ($n = 1$)	Advertisement ($n = 3$)	p
DISCERN	28 (16–53)	38 (24–64)	61 (61–61)	18 (16–42)	< 0.001
JAMA	2 (1–4)	3 (1–4)	4 (4–4)	1 (1–3)	< 0.001
GQS	2 (1–4)	4 (1–5)	5 (5–5)	2 (1–3)	< 0.001
USEFULNESS	2 (1–8)	2 (1–8)	8 (8–8)	2 (1–5)	< 0.001
PONS	3 (1–7)	3 (1–7)	10 (10–10)	1 (1–6)	0.113
VPI	29.23 (0–1454.51)	31.87 (15.45–248.32)	20.42 (20.42–20.42)	80.24 (76.35–286.89)	0.136
View ratio	31.35 (5.34–1513.44)	32.63 (5.89–255.83)	21.19 (21.19–21.19)	92.03 (81.17–342.09)	0.152

The Kruskal–Wallis test results are expressed as median (minimum-maximum) values

surgery. Obtaining correct information from reliable sources increases patient satisfaction and may improve treatment outcomes [19, 20]. Additionally, the increasing obesity rates make bariatric surgery increasingly preferred [21]. Furthermore, the increasing spread of bariatric surgery has led patients to seek more information over the internet. Because the accuracy of online information is variable and uncontrolled, the information can mislead patients and disrupt the balance in the clinician-patient relationship [22]. Additionally, once the patients obtain the wrong information on the Internet, informing them correctly and persuading them to adopt the appropriate treatment become more challenging.

Keelan et al. published the first YouTube™ assessment study on the quality of videos related to immunization [23]. Thereafter, studies aimed to evaluate the quality of medical videos were conducted. In many studies, the quality and accuracy of medical videos have been questionable [2, 10, 24–27]. In the present study, the video content comprised 76% patient experience, 14% relevant information, 8.8% nutrition education, and 2.6% advertisements. The mean DISCERN score, JAMA score, GQS, usefulness score, and PONS were 31.58/80, 2.25/4, 2.35/5, 3.10/10, and 3.59/10, respectively. These low scores indicated that the accuracy and quality of the videos about nutrition after bariatric surgery are far from informative, and these results were similar to previous study findings on bariatric surgery [2, 9].

The view ratio can be used as an alternative way to determine popularity. In the present study, physician-based and commercial videos were the most popular groups with higher VPI scores and view ratios. Additionally, the VPI scores of patient-based, physician-based, dietician-based, and commercial videos were found to be 29.23, 31.87, 20.42, and 80.24, respectively, and the VPI showed a significantly positive correlation with the view ratio, duration, and the number of likes ($p < 0.001$). The DISCERN score, JAMA score, GQS, and usefulness score were significantly higher in physician-based and dietician-based videos than in patient-based videos ($p < 0.001$). In DISCERN scoring, 47.4% of the videos were poor and 33.3% of them were very poor. Thus, YouTube™ users were mostly interested in insufficient information. The usefulness score was developed by Lee for gallbladder diseases in 2014 [16]. In 2018, Erdem and Şişik modified Lee's scoring to make it more suitable for the bariatric surgery patient group and used it in their study [2]. Because our study was also related to obesity surgery, the modification of Erdem and Şişik was considered a reference and used. Erdem et al. evaluated bariatric surgery videos on YouTube™ and concluded that 24.6% of them were beneficial and 53.7% were

Table 4 Correlations of the quantitative variables and scores

Variables	VPI (rho; p)	DISCERN (rho; p)	JAMA (rho; p)	GQS (rho; p)	USEFULNESS (rho; p)	PONS (rho; p)
View ratio	0.894**	0.039	− 0.053	0.037	0.108	0.045
	0.000	0.683	0.572	0.695	0.252	0.637
Duration	0.225*	0.214*	0.170	0.196*	0.241**	0.255**
	0.016	0.022	0.071	0.037	0.010	0.006
Number of likes	0.781**	0.224*	0.131	0.147	0.214*	0.077
	0.000	0.017	0.164	0.119	0.022	0.417
VPI	-	0.065	− 0.015	0.056	0.151	− 0.008
		0.493	0.876	0.554	0.110	0.933

**The correlation is significant at the 0.01 level

*The correlation is significant at the 0.05 level

p value; rho, Spearman's rho

useful but also concluded that YouTube™ videos on sleeve gastrectomy provided inaccurate information [2]. Starman et al. and Bruce-Brand et al. determined that most commercial-based videos have a potential bias in the provided information [28, 29].

In the present study, the video duration showed positive correlations with the VPI and quality scores. Biggs et al. reported that long videos concerning rhinosinusitis had few views and that people are more interested in short videos [30].

Limitations of the Study

PONS needs to be validated with further studies. Additionally, PONS was developed considering the ASMBS guidelines. The greatest advantage of PONS compared with the other scoring systems is that it provides responses to patient questions concerning nutrition after bariatric surgery. Because a single-day point was used to evaluate the quality of the videos, the search results may change over time. The search was limited to the first 100 videos for each keyword; thus, more recently uploaded or more preferred videos may have been excluded. However, most of the users were likely to use the information listed on the first few pages of the search results. The lack of evaluation of the relationships among the origins of the videos can be classified as another limitation. In the present study, the first 100 videos that were generated after typing the keywords were evaluated without classifying their origins. Despite these limitations, ours is the first study to investigate the quality of nutrition after bariatric surgery videos in the field of nutrition and dietetics.

Conclusion

The quality of online information on nutrition after bariatric surgery provided by YouTube™ is generally low, although most of the videos uploaded by physicians and dieticians had relatively higher quality scores. YouTube™ users preferred to watch patient-based and commercial videos that have relatively low quality. These findings indicate that dieticians should advise their patients on the poor information quality on YouTube™, which is a source of health information for bariatric surgery patients.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

Human and Animal Rights and Informed Consent Statement For this type of study, formal consent is not required.

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