

A comparison of educational quality, reliability and accuracy of videos in laparoscopic nissen fundoplication surgery: YouTube® vs WebSurg®

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ABSTRACT

Introduction: The objectives of this study were to assess the quality of data, reliability, scientific accuracy, and educational power of the videos published on YouTube® (YTb) and to compare two online video platforms, WebSurg® (WS) and YTb using novel scoring systems and laparoscopic Nissen fundoplication scoring system (LNFSS), which we modified from the recent literature considering pre-operative, perioperative, and post-operative evaluation of the laparoscopic Nissen fundoplication surgery.

Materials and Methods: The first 100 videos were reviewed on YTb, an open-access video platform, using "laparoscopic Nissen fundoplication" as the search term. The quality of data, reliability, scientific accuracy, and educational power of the videos were assessed through novel scoring systems such as video power index (VPI), DISCERN questionnaire (DISCERNqs), Journal of American Medical Association Benchmark Criteria (JAMABC), global quality score (GQSc), and LNFSS. The first 20 videos in WS were compared to the 20 YTb videos with the highest LNFSS scores.

Results: The first 100 YTb videos had an average VPI, DISCERNqs, JAMABC, GQSc, and LNFSS scores of 1034.9, 39.73, 2.06, 2.44, and 7.81, respectively. There was no significant difference between the first 20 WS videos and the 20 YTb videos in terms of video sources, time since upload, and number of views. WS videos had significantly more likes, fewer dislikes, and longer running times ($p=0.007$, $p=0.002$, and $p=0.043$, respectively). Significantly higher JAMABC scores were observed especially in WS videos ($p<0.001$). The VPI, DISCERNqs, GQSc, and LNFSS scores were evaluated between the two online video platforms, and no significant difference was found.

Conclusion: Laparoscopic Nissen fundoplication videos on YTb are below the expected quality. When videos with the highest LNFSS scores were selected from YTb's video database, no significant difference was found between WS and YTb in terms of educational quality. Thus, it is recommended to use LNFSS points to improve educational quality.

Keywords: Gastroesophageal reflux disease, Laparoscopy, Nissen fundoplication, Video, WebSurg, YouTube

Introduction

Today, all medical information resources are available on the internet. Therefore, medical professionals and surgical residents should be taught basic principles such as how to find

reliable sources, how to discriminate correct information, and how to make the right decision, rather than a regular kind of learning.^[1] The benefits of available online materials as a source of medical education are numerous. They increase the understanding and retention ability, and provide



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access to visual and audible resources from anywhere. Online materials are accessible every time and the data can be updated. Many factors which increase the cost are chopped off, therefore, online learning is cost effective.^[2,3]

The videos are highly effective patient education tools and also give users the opportunity to review a video to enhance understanding and develop questions. YouTube® (YTb), which has become one of the most popular video sharing platforms and the second largest search engine behind only to Google Search, was developed in 2005 by Steve Chen, Chad Hurley, and Jawed Karim.^[4] Billions of videos have been uploaded and shared on YTb from its launch to the present day. Recent studies have shown that most of the information being uploaded on to YTb provides inaccurate or confusing advice.^[5] Good quality videos should be accurate and based on the most up-to-date scientific evidence to consider all aspects of a surgical procedure, including the outcomes and areas of uncertainty. Shared decision-making between users and providers and evidence-based practice are important contributing approaches to improve video quality. Scoring systems were developed to evaluate the quality of visual contents. In addition, each different surgical approach requires a special scoring system to analyze the videos related to the surgical procedure.

WebSurg® (WS) is a free virtual surgical university, accessible worldwide through the Internet. WS provides medical students and surgery residents with the first online continuing medical education and information on the latest developments in laparoscopic surgery.^[6] WS videos go through the review process and are mostly prepared by academicians. Academic filtering process improves the quality of educational videos.

Gastroesophageal reflux disease is a common disorder related to the growing prevalence of obesity, eating habits, lifestyle-related factors, and *Helicobacter pylori* infection. Patients and their parents turn to the internet to learn about this disease and its treatment options. Medical therapy decreases the number of acid reflux episodes, but surgery is indicated for maximal medical therapy failure. Although, there are many techniques of anti-reflux surgery, Nissen fundoplication, which is also known as the 360° stomach wrap, is still the gold standard for surgical reflux control.^[7,8] The fact that Nissen fundoplication is still the most widely accepted surgical procedure for gastroesophageal reflux disease keeps the interest in this procedure intense.

The quality and reliability of the videos have been investigated in the literature for different diseases and treatment methods; however, to the best of our knowledge, no previous studies evaluating videos of laparoscopic Nissen fundoplication. In this study, our aim is to teach how to discern between trustworthy and misleading information on YTb and to compare laparoscopic Nissen fundoplication videos published on two online platforms, WS and YTb, by applying new scoring systems.

Materials and Methods

The standard search query selected was “sort videos based on relevance count.” A systematic search was conducted using the keyword “Laparoscopic Nissen Fundoplication” on August 1, 2021. The first 100 videos on YTb were reviewed in terms of descriptive characteristics (source and content), quantitative variables (time since upload, running time, views, likes, and dislikes), and scores according to novel scoring systems. The first 20 YTb videos with the highest laparoscopic Nissen fundoplication scoring system (LNFSS) scores were compared with the first 20 WS videos. These videos were evaluated by all authors. This type of study does not need Institutional Review Board approval.

Video popularity was assessed using the video power index (VPI). The formula of like ratio*view ratio/100 is used to calculate the VPI, which was first described by Erdem and Karaca.^[9] The points of DISCERN questionnaire (DISCERNqs), Journal of American Medical Association Benchmark Criteria (JAMABC), global quality score (GQSc), and LNFSS, which we modified from the recent literature considering pre-operative, perioperative, and post-operative evaluation of the laparoscopic Nissen fundoplication surgery, were used to evaluate the educational quality, reliability, and accuracy of the videos.

The DISCERNqs provides a valid and reliable way to assess the quality of medical videos.^[10] It consists of 16 questions, including 15 key questions plus a question based on the answers to all other questions for overall quality rating. Each of the questions requires a separate decision about the level of fulfillment of each criterion (5 points: Completely fulfilled; 2–4 points: Partially fulfilled; and 1 point: Not fulfilled). According to the answers to the questionnaire, videos are classified as high (≥ 65 points), moderate (33–64 points), or low (16–32 points) quality on a 0–80 scoring range.

The JAMABC evaluates the quality of the videos by determining whether a source of information is reliable, valid, and effective. It was originally described by Silberg et al.

and consists of four categories, including authorship, attribution, disclosure, and currency.^[11] Each of the criteria carries a maximum of 1 point, and data are classified as insufficient data (1 point), partially sufficient data (2–3 points), and completely sufficient data (4 points).

The GQSc, which was first described by Bernard et al., was used to assess the quality, flow, and ease of use of data presented online.^[12] This scoring system is a 5-point scale that ranges from poor to excellent quality (1 – poor, 2 – fair, 3 – average, 4 – good, and 5 – excellent).

The LNFSS has been developed by the authors of this article in recognition of the need for a general set of quality criteria for laparoscopic Nissen fundoplication procedure. It is divided into subsections according to the pre-operative preparation, perioperative phase, and post-operative care. The LNFSS checklist consists of 27 criteria, and each criterion is scored as one point by indicating either a “yes-no” decision about whether each criterion has been met (Table 1). K-means clustering divided the first 100 YTB

Table 1. Laparoscopic Nissen Fundoplication Scoring System

Before Surgery

1. Has the complete information been provided on how to select a patient to be a candidate for the operation?
2. Are the contraindications for the technique specified on video?
3. Is it mentioned whether the patient has any comorbid disease?
4. Is the age of the patient specified on video?
5. Is the gender of the patient specified on video?
6. Is the information about the patient's past surgical history stated?
7. Is the information about the patient's past medical history for gastroesophageal reflux disease stated?
8. Are patients' typical, atypical or extraesophageal symptoms specified on video?
9. Are preoperative tests including esophagogastroduodenoscopy (mandatory), ambulatory pH monitoring, barium esophagram or esophageal manometry specified on video?
10. Are the reasons for selecting Nissen fundoplication technique, among the antireflux surgery techniques, stated on video?

During surgery

1. Has the information been given about the patient's position in the operation room?
2. Has the information been given about the basic laparoscopic equipment required for this operation (insufflation with CO₂, drapes, monitors, laparoscopic instruments, electrocautery, etc.)?
3. Has the information been given about the additional equipment specific to the procedure (trocars, 30-degree angled laparoscope, bougie, endoscope, laparoscopic ultrasonic energy device dissector, etc.)?
4. Is any information about mesh usage (mesh type, size, etc.) specified on video?
5. Has the information been given about the position of the surgical team?
6. Is the information specified about the places for trocar insertion?
7. Has the information been given about the right and left crura and the retroesophageal window dissection technique?
8. Has any information been given about the prominent landmarks (gastroesophageal junction, phrenogastric ligament, short gastric vessels, gastrosplenic ligament, angle of His, gastrohepatic ligament, right and left crura, inferior vena cava, etc.) that must be seen during the surgery?
9. Is it stated whether selective vagotomy has been performed or not?
10. Has the information been provided on operative time?
11. Has the information been provided on possible intraoperative complications of the procedure?

After surgery

1. Has the information been provided on possible postoperative complications of the procedure?
2. Has the information been given about the postoperative pain levels, and postoperative recovery?
3. Has the information been given about the time of first oral intake and gradual increase of oral feeding?
4. Is the hospitalization period or discharge time specified on video?
5. Has the information been given about the patients' satisfaction?
6. Is the dietary plan of the patient after discharge stated?

videos into three clusters as poor quality (score <5.23), suboptimal quality (score 5.23–13.56), and good quality (score >13.56).

Statistical Analysis

The data analysis was performed using SPSS version 17.0 statistical software. The Kolmogorov–Smirnov test and histogram graphs were used to determine whether the underlying distribution is normal. Mean, standard deviation, median, interquartile range, and maximal and minimal values (max–min.) were used for normally and non-normally distributed descriptive data. The Pearson's Chi-square test was used to test independence between categorical variables. The Mann–Whitney U-test was used for comparing ordinal or non-normal variables between two groups, the Kruskal–Wallis test was applied to groups of more than 2. Spearman correlation test was used to measure the degree of association between two variables. The level of statistical significance was set at $p < 0.05$.

Results

A total of 100 videos obtained from YtB were evaluated and classified according to the source; academic (59%), physician (26%), commercial (7%), patient (5%), and unclassified (3%). Majority of the videos were about surgical technique (59%), information about disease or surgery (19%), lecture (13%), patient experience (5%), and advertisement (4%), respectively (Table 2). For each video, we recorded descriptive data, the time since upload, running time, the number of views, likes, and dislikes (Table 3). The mean duration was 13.59 min, and the mean time since upload was 1919.69 days. The mean number of total views, likes, and dislikes was 27571.45, 148.14, and 7.11, respectively. Scores of videos according to the scoring systems are outlined in Table 4. The mean VPI, DISCERNqs, JAMABC, GQSc, and LNFSS scores were 1034.9, 39.73, 2.06, 2.44, and 7.81, respectively. Technical quality of the laparoscopic Nissen fundoplication videos (LNFSS) was below the optimal quality.

The correlations between the descriptive characteristics and scores are displayed in Table 5. The DISCERNqs,

Table 2. Classification of the Visual Content of 100 YouTube® Videos

According to the source	n
1. Academic (author/s was/were affiliated with a university)	59
2. Physician (author/s not affiliated with a university)	26
3. Commercial	7
4. Patient	5
5. Unclassified	3
According to the content	
1. Surgical technique	59
2. Information about disease or surgery	19
3. Lecture	13
4. Patient experience	5
5. Advertisement	4

Table 3. Quantitative Variables of 100 YouTube® Videos

	Min-Max	Mean±SD (median)
Time since upload (days)	70-4204	1919.69±1169.11713 (1627.5)
Running time (minutes)	0.39-100.47	13.5932±15.7515272 (9.115)
View	40-1698220	27571.45±169505.813 (3225)
Like	0-8600	148.14±855.837882 (19)
Dislike	0-374	7.11±37.3780403 (1)

SD: Standard Deviation.

Table 4. Information on Scores

	Min-Max	Mean±SD (median)
VPI	0-38711.82	1034.9022±3916.16294 (208.33)
DISCERNqs	20-72	39.73±13.1094279 (38)
JAMABC	1-4	2.06±0.5444263 (2)
GQSc	1-5	2.44±1.17745488 (2)
LNFS	0-20	7.81±4.4714539 (7)

VPI: Video Power Index; DISCERNqs: DISCERN questionnaire; JAMABC: Journal of American Medical Association Benchmark Criteria; GQSc: Global Quality Score; LNFS: Laparoscopic Nissen Fundoplication Scoring System, SD: Standard Deviation.

Table 5. Comparison of Scores According to Descriptive Characteristics of 100 YouTube® Videos

	VPI	DISCERNqs	JAMABC	GQSc	LNFS
Video source					
Academic	126.75 (39.7-341.35)	41 (31-52)	2 (2-2)	3 (2-4)	8 (5-13)
Physician	230.97 (42.66-821.49)	33 (24-37)	2 (2-2)	2 (1-2)	5.5 (4-7)
Commercial	2521.36 (96.25-3920.5)	32 (28-44)	1 (1-2)	1 (1-4)	6 (1-8)
Patient experience	870 (774.99-1698.73)	38 (38-48)	2 (2-2)	2 (2-3)	4 (4-7)
Unclassified	991.29 (392.85-1715.31)	41 (24-63)	1 (1-1)	3 (1-4)	7 (4-13)
p	0.022	0.017	<0.001	0.009	0.018
Video content					
Surgical technique	126.75 (35.19-476.85)	33 (25-40)	2 (2-2)	2 (1-3)	7 (4-10)
Information about disease or surgery	701.35 (322.91-3325.31)	46 (36-51)	2 (2-2)	3 (2-4)	7 (3-10)
Lecture	114.29 (39.7-262.53)	61 (52-67)	3 (2-3)	4 (3-4)	11 (7-15)
Patient experience	870 (774.99-1698.73)	38 (38-48)	2 (2-2)	2 (2-3)	4 (4-7)
Advertisement	705.045 (60.945-2617.17)	28 (24-34.5)	1 (1-1.5)	1 (1-1.5)	5.5 (2.5-6)
p	0.001	<0.001	<0.001	<0.001	0.053

Kruskal–Wallis test, reported as median (first quartile, third quartile).

VPI: Video Power Index; DISCERNqs: DISCERN questionnaire; JAMABC: Journal of American Medical Association Benchmark Criteria; GQSc: Global Quality Score; LNFS: Laparoscopic Nissen Fundoplication Scoring System.

GQSc, and LNFS scores of academic sourced visual content were higher than physician sources ($p=0.017$, $p=0.009$, and $p=0.018$, respectively). Academic sources had higher JAMABC scores than commercial and unclassified sources ($p<0.001$). The findings of the study suggest that there is a significant correlation among video source and VPI ($p=0.022$). However, post hoc tests such as pairwise group comparisons were performed to evaluate the differences in VPI between video sources and no significant difference was found. VPI scores of the visual content focusing information about disease or surgery, patient experience, and advertisement were higher ($p=0.001$). DISCERNqs, JAMABC,

and GQSc scores of the visual content focusing lecture were higher ($p<0.001$). There was no significant correlation between video content and LNFS scores ($p=0.053$).

The correlations between the quantitative variables and scores are shown in Table 6. A negative correlation was found between VPI and time since upload and running time ($r=-0.258$, $p=0.01$; $r=-0.224$, $p=0.025$, respectively). There was a statistically significant correlation between VPI and number of views, likes, and dislikes ($p<0.001$). There was no significant correlation between quantitative variables and scores of the videos. The correlations were assessed between scoring systems (Table 7). DISCERNqs,

Table 6. Evaluation of the Relationship Between Quantitative Variables and Scores of 100 YouTube® Videos

	VPI	DISCERNqs	JAMABC	GQSc	LNFS
Time since upload (days)					
r	-0.258	-0.020	0.075	0.008	-0.002
p	0.010	0.842	0.457	0.940	0.982
Running time (seconds)					
r	-0.224	0.100	0.119	0.109	0.154
p	0.025	0.324	0.239	0.280	0.126
View					
r	0.831	0.105	-0.101	0.128	-0.002
p	<0.001	0.299	0.317	0.206	0.988
Like					
r	0.899	0.101	-0.151	0.099	-0.040
p	<0.001	0.317	0.133	0.327	0.692
Dislike					
r	0.666	-0.053	-0.178	-0.057	-0.121
p	<0.001	0.602	0.076	0.572	0.232

Spearman Correlation Test

VPI: Video Power Index; DISCERNqs: DISCERN questionnaire; JAMABC: Journal of American Medical Association Benchmark Criteria; GQSc: Global Quality Score; LNFS: Laparoscopic Nissen Fundoplication Scoring System.

Table 7. Determining the Relationship Level Between Scores of 100 YouTube® Videos

	VPI	DISCERNqs	JAMABC	GQSc	LNFS
VPI					
r	1.000				
p	-				
DISCERNqs					
r	0.144	1.000			
p	0.153	-			
JAMABC					
r	-0.135	0.303	1.000		
p	0.181	0.002	-		
GQSc					
r	0.169	0.920	0.257	1.000	
p	0.093	<0.001	0.010	-	
LNFS					
r	0.034	0.669	0.206	0.775	1.000
p	0.737	<0.001	0.040	<0.001	-

Spearman Correlation Test

VPI: Video Power Index; DISCERNqs: DISCERN questionnaire; JAMABC: Journal of American Medical Association Benchmark Criteria; GQSc, Global Quality Score LNFS: Laparoscopic Nissen Fundoplication Scoring System.

JAMABC, GQSc, and LNFS scores were positively correlated with each other; however, no correlation was found with VPI score.

Laparoscopic Nissen fundoplication videos published on the two online platforms, WS and Ytb, were compared regarding the descriptive characteristics and quantitative

variables (Table 8). No significant difference existed between video sources, time since upload, and number of views of the two online platforms ($p=0.349$, $p=0.142$, and $p=0.82$, respectively). Surgical technique-related content was significantly higher on WS videos than on Ytb videos ($p=0.012$). WS videos had significantly higher number of likes, lower number of dislikes, and longer running time ($p=0.007$, $p=0.002$, and $p=0.043$, respectively).

Scoring systems measuring the quality of data and educational power, were compared between WS and Ytb videos (Table 9). WS videos revealed higher JAMABC scores than Ytb videos ($p<0.001$). There was no significant difference between the two online platforms in terms of VPI, DISCERNqs, GQSc, and LNFSS scores.

Discussion

Halsted's model of "see one, do one, teach one" is the basic principle of surgery, and the modernization of surgery

and systems has facilitated the implementation of the first step of this principle with the advent of video-based learning.^[13] Video-based learning shortens the apprenticeship process, minimizes the time surgeons spent on technical training, and offers the opportunity to learn many different techniques.^[14]

Given the widespread and global incidence of gastroesophageal reflux disease, internet resources for disease-related information are becoming increasingly popular among physicians, patients, and their parents. In particular, patients and their parents may search websites such as Ytb for information because patient education resources provided by healthcare providers may be written at a level of understanding that is too high for them to understand and therefore cannot assess the quality, reliability, and accuracy of this information.^[15] With the laparoscopic Nissen fundoplication becoming the standard surgical treatment for gastroesophageal reflux dis-

Table 8. Comparison of Descriptive Characteristics and Quantitative Variables According to Website

	WebSurg® (n=20)	YouTube® (n=20)	p
Video source, n (%)			0.349 ¹
Academic	20 (100.00)	18 (90.00)	
Physician	0 (0.00)	1 (5.00)	
Unclassified	0 (0.00)	1 (5.00)	
Video content, n (%)			0.012 ¹
Surgical technique	19 (95.00)	11 (55.00)	
Information about disease or surgery	0 (0.00)	4 (20.00)	
Lecture	1 (5.00)	5 (25.00)	
Time since upload			0.142 ²
Mean±SD	2595.90±1372.84	1964.35±1262.72	
Median (Q1, Q3)	2583.00 (1568.50-3610.50)	1545.50 (1086.00-3665.00)	
Run time			0.043 ²
Mean±SD	21.29±16.13	20.74±26.01	
Median (Q1, Q3)	17.64 (10.47-24.28)	8.85 (7.45-19.35)	
View			0.820 ²
Mean±SD	3689.70±3157.36	7429.45±17877.74	
Median (Q1, Q3)	2864.00 (1815.50-4405.00)	3515.50 (1535.00-4565.50)	
Like			0.007 ²
Mean±SD	69.35±61.18	53.75±120.16	
Median (Q1, Q3)	46.50 (24.00-91.00)	15.00 (6.50-36.50)	
Dislike			0.002 ²
Mean±SD	0.00±0.00	3.00±7.94	
Median (Q1, Q3)	0.00 (0.00-0.00)	1.00 (0.00-2.00)	

¹Chi-Square Test ²Mann Whitney U Test Q1: first quartile; Q3: third quartile; SD: Standard Deviation.

Table 9. Comparison of Scores of Videos According to Website

	WebSurg (n=20)	YouTube (n=20)	p
VPI			0.242
Mean±SD	260.30±366.90	445.19±808.74	
(minimum–maximum)	(13.20–1301.29)	(24.37–3509.03)	
DISCERNqs			0.149
Mean±SD	47.90±7.61	52.30±10.23	
(minimum–maximum)	(37.00–60.00)	(31.00–72.00)	
JAMABC			<0.001
Mean±SD	3.00±0.00	2.25±0.64	
(minimum–maximum)	(3.00–3.00)	(1.00–4.00)	
GQSc			0.640
Mean±SD	3.70±0.73	3.80±0.83	
(minimum–maximum)	(3.00–5.00)	(2.00–5.00)	
LNFS			0.277
Mean±SD	13.60±4.26	15.10±2.10	
(minimum–maximum)	(7.00–21.00)	(13.00–20.00)	

Mann Whitney U Test

VPI: Video Power Index; DISCERNqs: DISCERN questionnaire; JAMABC: Journal of American Medical Association Benchmark Criteria; GQSc: Global Suality Score; LNFS: Laparoscopic Nissen Fundoplication Scoring System; SD: Standard Deviation.

ease, the number of videos uploaded to online video platforms about this surgical technique is increasing. This is the first study evaluating or comparing the educational quality, accuracy, and reliability of videos in the online video sites about laparoscopic Nissen fundoplication in the literature. The only study similar to the main idea of this study is about evaluation of Ytb videos and Google contents on gastroesophageal reflux disease reported by Aydin and Aydin.^[16]

Health professionals and patients are increasingly seeking for health information on the internet, and the quality of internet information is more critical than ever before.^[17] The present study revealed that the popularity of videos concerning laparoscopic Nissen fundoplication is not correlated with the academic and educational quality. False or misleading health information on internet may create serious problems that pose a substantial threat to patient safety and can cause patients to fail to take the necessary steps for optimal health care.^[18]

The first study evaluating the video quality on Ytb is about immunization reported by Keelan et al.^[19] The problem is that most research studies on video quality have been conducted with Ytb. There are very limited studies comparing the two online platforms, Ytb and WS. Chavira

et al. also conducted a comparative study focusing on the critical view of safety in laparoscopic cholecystectomy of WS and GIBLIB videos, comparing the results with Ytb videos. The videos were reviewed using critical view of safety score and the Ytb and non-Ytb groups were compared. Although the results obtained from each of the platforms were GIBLIB 40%, WS 44.4%, and Ytb 27.7%, it was determined that specialized platforms did not have a statistically significant superiority over the mass broadcast platform ($p=0.142$).^[20] The aim of our study is to evaluate the quality, accuracy, and reliability of Ytb videos and to compare the two online video platforms, Ytb and WS, in terms of laparoscopic Nissen fundoplication videos.

One particular topic that health professionals and patients would like to have information is the surgical techniques for gastroesophageal reflux disease. The choice of fundoplication technique is mostly dictated by the results of pre-operative tests including endoscopy, barium swallow, esophageal manometry, and pH monitoring and should also be made on a patient-by-patient basis. The 360° Nissen fundoplication has been the standard operation for gastroesophageal reflux, but it also has side effects such as dysphagia, inability to belch or vomit, bloating, and most frequent bowel movements of flatus.

Toupet fundoplication is a partial stomach wrap around the low esophageal sphincter and minimizes some of the well-known side effects of the Nissen fundoplication. However, concerns of GERD recurrence have led surgeons to select the Nissen rather than the Toupet technique.^[21,22] Our study revealed that there was a greater proportion of YTb videos related to surgical technique, with a total of 59% (19% information about disease or surgery, 13% lecture, 5% patient experience, and 4% advertisement) of the video categories. Our findings are harmonious with the results of the previous studies.^[23-25]

In this study, the mean DISCERNqs, JAMABC, GQSc, and LNFSS scores of YTb videos were 39.73/80, 2.06/4, 2.44/5, and 7.81/27, respectively. These scores indicate suboptimal quality, accuracy, and reliability. Although most of the videos were rated as moderate regarding their sufficiency of information, this study demonstrated that YTb videos should still not be considered a fully reliable source of information on laparoscopic Nissen fundoplication. Similar to the literature, YTb videos are below the expected quality and provide moderate information for Nissen fundoplication.^[23,26,27] The reason that the educational quality of the videos appears to be suboptimal might be that the mean running time of the YTb videos in our study is 13.59 min and most parts of the surgical procedure are edited and cut. Laparoscopic Nissen fundoplication surgery usually takes 50–120 min.^[28] Therefore, the fact that the YTb videos in this study are too short compared to the standard operation time causes them to not meet the requirements of the criteria of scoring systems.

In the present study, video contents of information about disease or surgery, patient experience, and advertisement were the most popular groups with the higher VPI scores. In contrast, the lowest VPI scores were found for the lecture videos, but the DISCERNqs, JAMABC, GQSc, and LNFSS scores were the best. Similar to the previous studies of YTb consumption, this study has also shown that viewers tend to watch more popular videos, which are typically lower in educational quality, and they are mostly interested in unnecessary and inadequate information.^[23,24] For this reason, patients may be receiving biased information and physicians should be aware of such information that patients obtain from YTb.

The run time and the time since upload of the videos showed negative correlations with the VPI. Based on the YTb videos analyzed, short video length did impact audience retention because information needs to be com-

pressed to keep the video interesting. Similar to our outcomes, integrative review was performed by Haslam et al. who reported that most users prefer short and recently uploaded videos.^[29] The number of views showed a significantly positive correlation with the number of likes and dislikes because as the video viewing rate increases, users comment on the video and indicate whether they like it or not. In parallel with the results of our study, Chang and Park also concluded that there was a significant positive correlation between number of the views, number of likes, and number of dislikes videos published on YTb.^[30]

The JAMABC evaluates the transparency and publication information of each video.^[11] JAMABC scores of academic sourced YTb videos were significantly higher than those of other sourced YTb videos ($p < 0.001$). WS videos are provided by world-renowned academicians in all surgical fields and all videos are academic sourced.^[6] Thus, JAMABC scores of WS videos were significantly higher than YTb videos ($p < 0.001$). The reason for these higher JAMABC scores of academic sourced YTb videos and WS videos is that videos uploaded by health professionals affiliated with a university are more reliable and transparent.^[31,32]

The LNFSS scores of WS and YTb content on laparoscopic Nissen fundoplication were 13.6/27 and 15.1/27, respectively ($p = 0.277$). The close rates might be relevant to the fact that all the selected 20 WS and 18 out of 20 YTb videos with the highest LNFSS scores evaluated are academic sourced visual contents. Furthermore, high LNFSS scores in these two online video platforms are the indirect indicators that the data expected from WS and selected YTb videos are good quality according to the K-means clustering method for quality assessment of LNFSS. It has been shown in this study that the YTb content, carefully selected considering its medical and technical quality on laparoscopic Nissen fundoplication, is almost as accurate as the WS content.

Conclusion

This study measures the diversity in quality of laparoscopic Nissen fundoplication surgery videos, as video content on the YTb online video platform can be published without peer review or confirmation of veracity. Intellectual filters of WS ensure a homogeneous distribution in terms of video quality. Certain scoring systems can enhance educational and technical quality of YTb videos. Well-chosen and well-implemented scoring systems for

video selection and analysis on online video platforms are essential for all types of evaluations.

Disclosures

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