Reliability of Information on Youtube™ Regarding Temporomandibular Joint Arthrocentesis: Cross-Sectional Research

Youtube™daki Temporomandibular Eklem Artrosenteziyle İlgili Bilgilerin Güvenilirliği: Kesitsel Araştırma

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ABSTRACT Objective: Temporomandibular joint diseases are very common chronic diseases. Arthrocentesis is one of the most preferred treatment methods, especially as a minimally invasive technique. The aim of this study is to determine the quality and usefulness of YouTube™ videos about arthrocentesis. **Material and Methods:** In this study, the first 200 search results by using keyword (TMJ arthrocentesis) on YouTube™ were examined. In order to determine the content levels, a content scale consisting of 12 categories was created. Likewise, the quality level was determined by using the video information and quality index scale, and each video was scored double-blindly. **Results:** According to the total content score, 65 videos were found to have a low content level, while 9 videos had a high content level. Among these 74 videos, 90.5% of them were uploaded by health professionals and 91.8% of them were educational. Total video information and quality index score was also found to be significantly higher in high content level videos than low content level videos (p<0.05). **Conclusion:** We observed that the quality of most videos uploaded to YouTube™ about arthrocentesis was poor. It is very important that the physicians who will perform the procedure fully inform the patient.

Keywords: Temporomandibular joint;
temporomandibular joint disorders;
arthrocentesis; social media; Youtube

ÖZET Amaç: Temporomandibular eklem hastalıkları çok sık görülen kronik hastalıklardır. Artrosentez özellikle minimal invaziv bir teknik olarak en çok tercih edilen tedavi yöntemlerinden biridir. Bu çalışmanın amacı, artrosentez ile ilgili YouTube™ videolarının kalitesini ve kullanışlılığını belirlemektir. **Gereç ve Yöntemler:** Bu çalışmada, YouTube™da anahtar kelime (TMJ artrosentez) kullanılarak yapılan aramanın ilk 200 sonucu incelenmiştir. İçerik düzeylerini belirlemek için 12 kategoriden oluşan bir içerik ölçeği oluşturulmuştur. Aynı şekilde video bilgileri ve kalite indeksi ölçeği kullanılarak kalite düzeyi belirlenmiş ve her video çift kör olarak puanlanmıştır. **Bulgular:** Toplam içerik puanına göre 65 videonun içerik düzeyi düşük, 9 videonun içerik düzeyi yüksek bulundu. Bu 74 videonun %90,5'i sağlık çalışanları tarafından yüklendi ve %91,8'i eğiticiydi. Toplam video bilgisi ve kalite indeks puanı da yüksek içerik seviyeli videolarda düşük içerik seviyeli videolara göre anlamlı olarak daha yüksek bulundu (p<0,05). **Sonuç:** Artrosentez hakkında YouTube™a yüklenen çoğu videonun kalitesinin düşük olduğunu gözledik. İşlemi yapacak hekimlerin hastayı tam olarak bilgilendirmesi çok önemlidir.

Anahtar Kelimeler: Temporomandibular eklem;
temporomandibular eklem bozuklukları;
artrosentez; sosyal medya; Youtube

Temporomandibular joint disorders (TMD) are complicated diseases characterized by pain in the temporomandibular joint (TMJ), masticatory muscles, adjacent bones, and soft tissues, and may cause loss of function. Symptoms such as muscle and joint pain, limitation of mouth opening, clicking sounds in the TMJ, and difficulty in speaking are observed in TMD.[1,2] These symptoms are observed in the major-ity of the patient population and are most commonly seen between the ages of 20 and 40.[3]

The methods that are used for the treatment of TMD range from non-invasive techniques to invasive surgical procedures. Arthrocentesis is a minimally invasive method preferred especially for treating the internal derangements of the TMJ. A double-needle technique under local anesthesia is

used, which enables the removal of the inflammatory mediators in the upper joint cavity and the intra-articular adhesions in the joint. Consequently, the joints are injected with drugs such as steroids and hyaluronic acid, reducing symptoms such as joint pain and limited mouth opening.[4,5]

Nowadays, patients can get information about various treatment procedures through the internet, especially social media, and the quality of these contents may affect the attitudes of the patients towards treatment. Since 2005, YouTube™ (YouTube, LLC., San Bruno, CA) has been extremely popular, becoming the third most visited website worldwide.[6] YouTube™ platform enables people to learn about many medical issues and treatments through videos, thus the reliability and accuracy of the video content on these subjects have become more important.

With this study, we aimed to determine the quality of arthrocentesis-related videos published on YouTube™ and to investigate their effectiveness in increasing the knowledge of patients and healthcare professionals.

MATERIAL AND METHODS

Since the source of this study is available internet data, ethical approval is not required. The most used words around the world were chosen as keywords in the study. For this purpose, the "Google Trends (Google, Mountain View, CA, United States)" (https://trends.google.com/trends/?geo=US) application was used. In Google Trends, the most used keyword for TMJ arthrocentesis was found to be "TMJ arthrocentesis". Searching was performed on YouTube™ (https://www.youtube.com) by using these keywords in the default settings (sort by relevance) on December 25, 2020. The results of this search including the names and sources of the first 200 videos with a uniform resource locator and the descriptive characteristics of the videos were listed (Table 1). According to previous research, on YouTube™ users have viewed the top 30 videos related to the results of their searches. In addition, it has been reported that the majority of users do not look at other pages when they cannot find what they are looking for on the first page.[6,7]

SCANNING OF VIDEOS

The first 200 videos found as a result of the search were evaluated according to the criteria of the study. The inclusion criteria were: 1) English language use in the video; 2) Videos should be related to the researched topic. The exclusion criteria were: 1) Use of languages other than English in the video; 2) Videos unrelated to the searched subject; 3) Videos that were a continuation of each other; and 4) Videos

TABLE 1: Descriptive characteristics of the YouTube™ videos.					
	Minimum	Maximum	Mean	SD	Median
Video characteristics variables					
No. of views	18	517763	18292.01	83786.02	1059
Duration in minutes	00:07	01:55:26	14:05	25:53	4:30
No. of comments	0	469	14.43	61.39	1
No. of likes	0	744	51.03	142.33	10.5
No. of dislikes	0	288	7.76	38.59	0
Days since upload	12	3821	1123.82	930.42	835.5
Interaction index	0	15.8	1.48	2.68	0.67
Viewing rate	3	14781	848.2	2459.06	185.41
Total content score	0	8	2.27	2.42	1
VIQI content assessment					
Flow of information	1	5	2.15	1.34	2
Information accuracy	1	5	3.85	0.66	4
Quality	1	2	0.6	0.76	0
Precision	2	4	3.77	0.51	4
VIQI total score	5	16	10.37	2.38	10

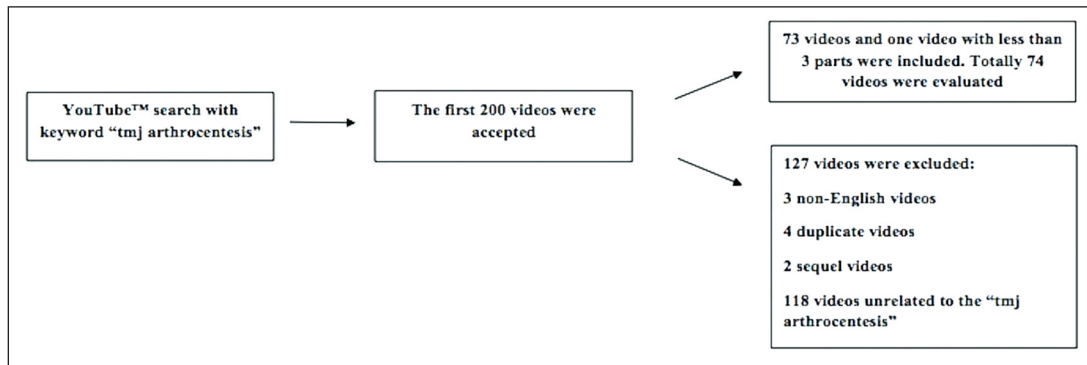SD: Standard deviation; VIQI: Video information and quality index.

FIGURE 1: 74 out of 200 videos were included in the study.

that were duplicates. In addition, videos consisting of three or less episodes were evaluated separately and added to the study.

73 videos were found that met the inclusion criteria in this study. One video included two episodes and these episodes were evaluated separately. As a result, the number of videos evaluated in the study was 74 (Figure 1).

Country of origin, number of views, duration in minutes, number of comments, number of likes, number of dislikes, and upload date were recorded for each video. The researchers who analyzed the content of the videos did not have access to the number of likes, dislikes, and comments of the videos, to facilitate an objective assessment. In addition, the videos were watched by two researchers, and content reviews and scoring were made individually. Different decisions were later discussed, and consensus was reported. The viewing rate formula and the interaction index formula were used to calculate viewer interactions.[7]

$$\text{Viewing rate} = \frac{\text{Number of views}}{\text{Number of days since upload} \times 100\%}$$

$$\text{Interaction index} = \frac{\text{Number of likes} - \text{Number of dislikes}}{\text{Number of views} \times 100\%}$$

EVALUATION OF VIDEOS

The videos were uploaded from various sources, but the sources were divided into 3 main groups and the videos were classified accordingly: 1) healthcare professionals, 2) commercial (healthcare companies and web pages), and 3) individual users. In the same way, the videos were further categorized into two groups

according to their type: 1) educational (awareness-raising videos), and 2) testimonial (personal experience about TMJ arthrocentesis, videos that help decide if it is right for them).

The videos were analyzed according to their content and their content scores were determined based on the inclusion of twelve subjects: TMJ description, TMD definition, etiology, clinical symptoms, radiological features, advantage, indication, contraindication, procedure (comprehensive explanation of arthrocentesis), complication (pain, swelling, bleeding, auditory problems, etc.), prognosis, and cost. 1 point was given to a video for each content mentioned. When the total score of the video was between 0-5, the video was classified as low content level, while a total score between 6-12 was classified as high content level. In addition, video information and quality index (VIQI) were used to analyze the quality of the videos. The VIQI scale is a 5-point Likert scale. 1 point indicates low quality and 5 points indicate high quality. Information flow, information accuracy, quality (one point each for the use of still images, animation, community interviews, video captions, and a report summary) and precision (level of consistency between video title and content) are evaluated, and a total score is determined.[7]

STATISTICAL ANALYSIS

Statistical analysis of the data was performed using the 21.0 SPSS package program (IBM Corp., Armonk, NY, USA). Shapiro-Wilk test and Mann-Whitney U test were used to compare non-normally distributed parameters and quantitative data. Fisher exact and Fisher-Freeman-Halton tests were used for
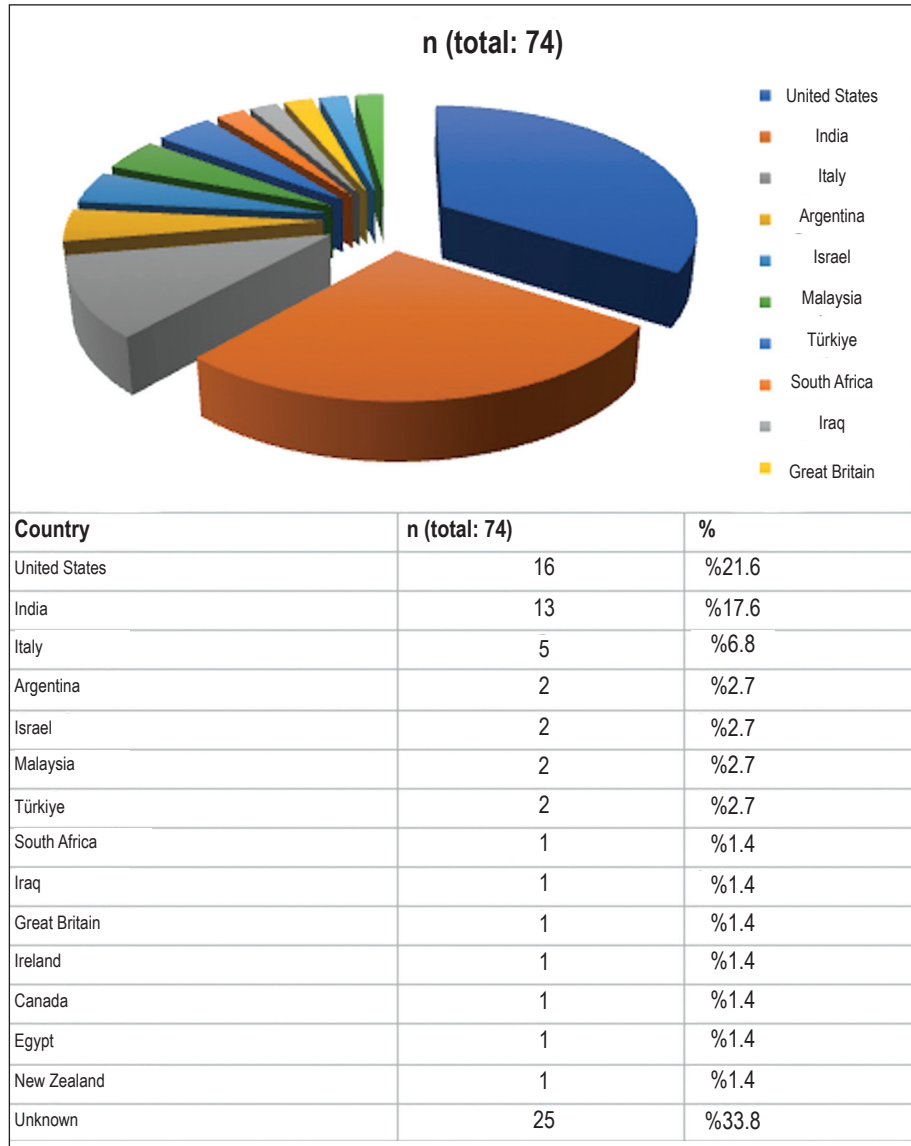
FIGURE 2: Distribution of video uploads in countries.

Country	n (total: 74)	%
United States	16	%21.6
India	13	%17.6
Italy	5	%6.8
Argentina	2	%2.7
Israel	2	%2.7
Malaysia	2	%2.7
Türkiye	2	%2.7
South Africa	1	%1.4
Iraq	1	%1.4
Great Britain	1	%1.4
Ireland	1	%1.4
Canada	1	%1.4
Egypt	1	%1.4
New Zealand	1	%1.4
Unknown	25	%33.8

nominal variables. Correlations between parameters were analyzed by Spearman correlation analysis. $p < 0.05$ value was considered significant.

RESULTS

The origin-country of 33.8% of the 74 videos evaluated in this research could not be determined. The top three countries, where videos are uploaded from, were the United States of America (21.6%), India (17.6%), and Italy (6.8%) respectively. The most uploaded countries after these were Argentina, Israel, Malaysia, Türkiye, South Africa, Iraq, Ireland, Canada, Egypt, and New Zealand, respectively (Figure 2).

90.5% of the videos were uploaded by healthcare professionals, 4.1% by commercial accounts and 5.4% by layperson. 91.8% of them were educational and 8.2% of them were testimonial. The average video duration was 14:05±25:53 minutes and the average days since upload was 1123.82±930.42. The videos were viewed with an average of 18292.01±83786.02 times, while the average number of comments was 14.43±61.39. The number of likes was 51.03±142.33, and the number of dislikes was

7.76±38.59. The average viewing rate and the average interaction index were calculated, they were found to be 1.48±2.68 and 848.2±2459.06, respectively. The average total content score (TCS) was calculated at 2.27±2.42 and the average VIQI total score was calculated at 10.37±2.38 as shown in Table 1.

When classified according to the content score, 65 (87.84%) out of 74 videos were defined as low content level, and 9 (12.16%) were defined as high content level. The high content level videos were all educational videos uploaded by healthcare professionals. The high content level videos mentioned the terms TMJ description, TMD definition, etiology, clinical symptoms, radiological features, advantage, indication, procedure, and prognosis in higher numbers compared to low content level videos (p<0.05). There was no statistically significant difference between groups in terms of mentioning contraindication and complication as shown in Table 2 (p>0.05). In addition, there was a statistically significant difference between high and low content level videos in terms of video duration and days since upload, but no significant difference was found in terms of other descriptive characteristics. However, high and low content level videos were statistically significantly different in terms of VIQI scale in all categories except quality, and VIQI total score as shown in Table 3 (p<0.05).

When the correlation between video characteristics, TCS, and total VIQI score were examined, a positive correlation was observed between the TCS, and the VIQI total score. There was also a positive correlation between the TCS and both of the video duration in minutes and days since upload (p<0.05), Likewise, a positive correlation was found between the TCS and interaction index (p<0.05), but the correlation between the days since upload and the TCS was negative (p>0.05). In addition, a positive correlation was observed among the VIQI total score and the video duration and interaction index, while a negative correlation was observed between this score and the days since upload as shown in Table 4 (p<0.05).

TABLE 2: Distribution of the YouTube™ videos between low and high content video groups.				
	Total content score			
	Low (n=65) n (%)	High (n=9) n (%)	Total (n=74) n (%)	p value
Video source of upload				
Healthcare professionals	58 (89.2)	9 (100)	67 (90.5)	#1.000
Commercial	3 (4.6)	0 (0)	3 (4.1)	
Layperson	4 (6.2)	0 (0)	4 (5.4)	
Video type				
Educational	59 (90.8)	9 (100)	68 (91.9)	1.000
Testimonial	6 (9.2)	0 (0)	6 (8.1)	
Contents				
TMJ description	7 (10.8)	8 (88.9)	15 (20.3)	0.000*
TMD definition	19 (29.2)	9 (100)	28 (37.8)	0.000*
Etiology	9 (13.8)	7 (77.8)	16 (21.6)	0.000*
Clinical symptoms	23 (35.4)	9 (100)	32 (43.2)	0.000*
Radiological features	10 (15.4)	7 (77.8)	17 (23)	0.000*
Advantage	6 (9.2)	4 (44.4)	10 (13.5)	0.016*
Indication	11 (16.9)	9 (100)	20 (27)	0.000*
Contraindication	0 (0)	1 (11.4)	1 (1.4)	0.122
Procedure	12 (18.5)	5 (55.6)	17 (23)	0.026*
Complication	5 (7.7)	0 (0)	5 (6.8)	1.000
Prognosis	3 (4.6)	3 (33.3)	6 (8.1)	0.021*
Cost	1 (1.5)	0 (0)	1 (1.4)	1.000

All parameters were applied Fischer Freeman Halton test; #Fischer' exact test; *Statistical significant (p<0.05); TMJ: Temporomandibular joint; TMD: Temporomandibular joint disorders.

TABLE 3: Comparison of the YouTube™ video variables between low and high content video groups.			
	Total content score		
	Low (n=65)	High (n=9)	Mann-Whitney U
	X̄±SD	X̄±SD	p value
Video characteristics			
No. of views	20574.03±89234.11	1018.78±2946.01	0.231
Duration in minutes	7.20±13.86	57.51±44.63	0.000*
No. of comments	16.25±65.35	1.33±2	0.402
No. of likes	54.22±151.21	28±35.46	0.585
No. of dislikes	8.77±42.1	0.44±0.53	0.790
Days since upload	1215.77±912.79	459.78±817.95	0.001*
Interaction index	1.38±2.76	2.24±2.02	0.061
Viewing rate	901.38±2617.77	464.14±410.04	0.139
VIQI content assessment			
Flow of information	1.83±1.07	4.44±0.73	0.000*
Information accuracy	3.74±0.59	4.67±0.5	0.000*
Quality	0.45±0.64	1.67±0.71	0.504
Precision	3.75±0.53	3.89±0.33	0.000*
VIQI total score	9.77±1.77	14.67±1.66	0.000*

*Statistical significant (p<0.05); SD: Standard deviation; VIQI: Video information and quality index.

TABLE 4: Evaluation of correlation between YouTube™ video variables, total content score, and VIQI.			
	Spearman correlation	Total content score	VIQI total
Total content score	r		0.697
	p		0.000*
No. of views	r	-0.121	-0.136
	p	0.303	0.249
Duration in minutes	r	0.754	0.557
	p	0.000*	0.000*
No. of comments	r	-0.028	-0.068
	p	0.813	0.565
No. of likes	r	0.238	0.155
	p	0.41	0.187
No. of dislikes	r	-0.044	-0.65
	p	0.713	0.580
Days since upload	r	-0.389	-0.353
	p	0.001*	0.002*
Interaction index	r	0.454	0.302
	p	0.000*	0.009*
Viewing rate	r	0.116	0.116
	p	0.326	0.325

*Statistical significant (p<0.05); r: Correlation coefficient; p: Statistical value; VIQI: Video information and quality index.

DISCUSSION

YouTube™ is one of the favorite platforms that people use for searching about medical and dental practice subjects because it is easy to use and enables free access.[8] There are many studies in the literature about YouTube™ videos related to medical and dental practices. Many medical and dental topics such as heart transplantation, epilepsy, hypertension, childhood caries, orthognathic surgery, dental implants, teeth

whitening, sinus lift surgery have been investigated by using YouTube™ videos on these subjects.[6,9-15]

Recently, TMD became more common due to increasing stress levels.[1] Arthrocentesis is a minimally invasive treatment method that is frequently used in the treatment of TMD, especially when conservative treatment methods are not sufficient.[4] This method is a partially surgical procedure and patients generally have little knowledge of the procedure. Therefore, when patients are informed about this procedure, they tend to research the procedure before accepting the practice. The average number of views of the videos we found was 18292.01. This shows that the videos uploaded about arthrocentesis are watched quite a lot. In this study, we aimed to evaluate YouTube™ videos about TMJ arthrocentesis in terms of content levels and quality degrees, thus revealing the level of benefit that people and healthcare professionals can obtain from YouTube™ videos.

Both patients and healthcare professionals can upload content on medical matters on YouTube™, and since the contents are visual and easily accessible, these videos are also frequently used by both patients and healthcare professionals. The fact that videos can be uploaded by anyone without any evaluation or review may affect the accuracy of the information in the videos. In addition, videos uploaded by various organizations for advertising purposes, and discounts as a result of comments and likes on these videos can also negatively affect the reliability of the videos. In particular, videos uploaded by individual users with personal experiences are subjective and the accuracy of the information contained is questionable. Most studies show that the majority of the videos on dentistry are educational videos uploaded by healthcare professionals, except the videos on orthognathic surgery and teeth whitening which are mostly uploaded by individual users.[6,12-15] In this study, it was found that most of the videos uploaded about arthrocentesis were educational videos uploaded by healthcare professionals. When the videos in our study are evaluated from this point of view, we think that the uploaders are mostly healthcare professionals and that there is no major problem in arthrocentesis related videos in terms of reliability. However, uploading videos by healthcare profes-

sionals does not always mean videos contain high quality and accurate information. The content quality of the videos should be evaluated in order for patients to obtain accurate and complete information. The videos examined in this study were seperated into two groups as high and low content levels according to their content score. None of the videos received full points, and only 9 (12.16%) out of 74 videos were found to be high content level. There are no restrictions or content controls on medical videos on YouTube™. Therefore, the content quality of medical videos is often lacking and inadequate.[16] This situation shows that the number of high-quality videos about arthrocentesis should increase in order to reach accurate and complete information on YouTube™.

The durations of YouTube™ videos with medical content vary considerably. When the videos about arthrocentesis were examined, we frequently came across videos that only show the irrigation moment and give very limited information. The average duration of the videos in this study was found to be 14:05 minutes, and there was a significant difference in duration between high content level videos and low content level videos, where high content level videos were longer than the low content level videos. In addition, there was a significant difference between low and high content level videos in terms of days since upload in this study, and recently uploaded videos had higher content levels. Also, we detected a correlation between VIQI total score, TCS, video duration and days since upload with the correlation tests we performed. Previous studies show that the longer the duration of the video, the more detailed and high-quality information is provided on the subject.[17,18] The fact that our study has similar results with previous studies shows that recently uploaded videos have more current and high-quality content than videos uploaded a long time ago.[17,19]

The features such as the number of likes, dislikes and views of the videos affect the rate of the videos being recommended and encountered in searches depending on the YouTube™ algorithm. In addition, the viewing rate and interaction index used in the evaluation of YouTube™ videos are calculated by using these descriptive features. In this study, no significant difference was found between low and high

content level videos in terms of these features. However, the interaction index was found to be positively correlated with the TCS and the VIQI total score. This shows that high-quality videos get relatively more interaction. Although, the interaction index should not be considered to be strictly related to high-quality videos. A wide variety of results have been revealed in the studies in the literature on this subject. In a study on space maintainers, it was shown that the descriptive features of videos are not related to their quality levels, which is consistent with the results of our study.[20] Conversely, López-Jornet et al. reported that there is a relationship between some descriptive features and quality levels.[21] In addition, there are studies showing that there is no evidence for the relationship between viewing rate and interaction index.[15,18,22-24] On the contrary, as a result of a study published by Fortuna, it was shown that there is a significant relationship between the interaction index and video content levels.[25] In light of this information, it should be considered that the content level of the first videos that we come across as a result of the interaction as a result of a search on a subject may not always be high. Overall, these results suggest that the content level and quality cannot be predicted based on the descriptive characteristics of the videos.

The VIQI scale is frequently used to measure the information and quality of videos. It is a Likert scale-based scoring system that evaluates videos from various aspects.[7] According to the content scoring we used, videos with high content levels also had higher scores in terms of VIQI total score. In addition, when the relationship between the VIQI total score and the TCS was examined, we observed a positive relationship in accordance with the literature.[6,7,21,26,27] This shows that the information-quality index and the content levels of the videos are consistent with each other. Also, this situation supports the accuracy of the content categories we use and our low-high content classification method. There are studies in the literature showing that there is a significant difference between content levels in terms of VIQI scoring.[6,18] In our study, the lack of difference between content levels in the quality category, which is one of the VIQI content, shows that the videos are generally not supported by various visual and explanatory texts.

In our study, we found that the complications and cost of the arthrocentesis procedure were not mentioned in any of the high content quality videos. The complication was mentioned in only 6.8% of all videos examined. In addition, we have seen that in general, issues such as advantage, contraindication, complication, prognosis and cost are mentioned in very few videos. Nowadays, while the trend towards YouTube™ has increased so much, it is very important to make these platforms where people can get complete and accurate information. In the future, it may be considered to upload videos containing accurate and complete information about medical practices, medications, diagnosis and treatment methods to various internet platforms by reliable health institutions and associations known around the world.

According to our results, YouTube™ videos on arthrocentesis were highly variable in quality and content. We also demonstrated that the characteristics of the videos such as likes, comments, dislikes can mislead people, and the majority of videos uploaded on medical subjects have a low content quality. The low number of YouTube™ videos about arthrocentesis and the fact that most of them have a low content quality show that there is a need for better-prepared videos. Results of similar studies may be variable according to the keywords used in a search on any subject and Google Trends can be used for finding the right keywords. The limiting factor of this study is that the searching results of the research were only English videos.

CONCLUSION

YouTube™ videos on arthrocentesis are not of sufficient quality for patients and non-specialized healthcare professionals and are limited in number. Physicians should explain the arthrocentesis procedure to their patients in detail so that patients can have accurate and high-quality information about the procedure. Examining the videos uploaded to the Internet in terms of quality and accuracy before they are uploaded is an issue that may come to the fore in the future. In addition, the accuracy and quality of the information on this subject should be evaluated for other social media platforms.

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