Original Article

YouTube as a source of information on piriformis syndrome exercises

Uğur Ertem , Süheda Özçakır , Fatma Jale İrdesel , Selim Mahmut Günay

Department of Physical Medicine and Rehabilitation, Uludağ University Faculty of Medicine, Bursa, Türkiye

ABSTRACT

Objectives: This study aimed to evaluate the quality and reliability of the most viewed YouTube videos on piriformis syndrome (PS) exercises and identify criteria that may be important for selecting high-quality and reliable videos.

Materials and methods: We searched for the keywords "piriformis syndrome exercise," "piriformis syndrome rehabilitation," "piriformis syndrome physical therapy," and "piriformis syndrome physiotherapy" on November 28, 2021. The modified DISCERN (mDISCERN), and the Global Quality Score were used to evaluate the quality and reliability of the videos.

Results: Of the 92 videos evaluated, most (58.7%) of the videos were shared by healthcare professionals. The median mDISCERN score was 3, and most of the videos were found to be medium or low quality. Videos with more subscribers (p=0.001), a shorter upload duration (p=0.001), videos uploaded by physicians (p=0.004), and videos uploaded by other healthcare professionals (p=0.001) were found to have high reliability. Conversely, videos uploaded by independent users were found to have low reliability (p<0.001). When the parameters of the videos were compared among the quality groups, significant differences were found in all video features (p<0.05), some upload sources (other healthcare professionals and independent users; p=0.001), and mDISCERN scores (p<0.001).

Conclusion: It is beneficial for physicians and other health professionals to upload more videos about health to increase the amount of reliable and high-quality information.

Keywords: Health education, piriformis muscle syndrome, social media.

Piriformis syndrome (PS) is a form of sciatica caused by the compression of the sciatic nerve by the piriformis muscle.[1] Piriformis syndrome is often underdiagnosed.[2] The prevalence of PS among patients with chronic low back pain is 17.2%.[3] In another study, the incidence of PS was roughly 17% in patients with sciatic-type pain and negative spinal imaging.[4] However, it is difficult to give precise data on the prevalence of PS as it is difficult to diagnose. Although the diagnosis of PS is generally made by medical history and physical examination, diagnosis using ultrasound-guided injection is also a helpful method.[5] The differential diagnosis of PS includes many other causes of low back pain, buttock pain, and sciatica, including radiculopathy.[1] Treatment options for lower back pain and sciatica related to PS include the physical therapy, exercises, anti-inflammatory drugs, local anesthetic and corticosteroid injections, and botulinum neurotoxin injections.[6,7] Surgical treatment may be a good option in patients who do not respond to the appropriate conservative treatment methods.[8]

Internet use has become very common nowadays. Its role in providing easy and fast access to information increases its use. Through the internet, it is possible to gain knowledge in many fields. Due to the ease of access to the internet, individuals primarily use the

internet to obtain information.[9] The internet has also become a prominent resource for patients to get information about their diseases. In a study evaluating primary care patients' health-related internet use, it was found that more than half of the patients had searched the internet for health information.[9]

YouTube is a widely used video-sharing media that allows individuals to watch or share videos on a variety of topics. As it is free and easy to access, YouTube is used by internet users as a source of information on many topics, including health-related information. In a study of videos about food poisoning on YouTube, most of the videos were found to be educational.[10] Another study found that much of the content of YouTube videos about fibromyalgia was of low quality.[11] YouTube's primary handicap is the lack of a mechanism to check the quality and accuracy of videos.[12] Apart from this, the points to be considered in the selection of correct and reliable videos about health are not clear. Due to these disadvantages, this platform, which is seen as an information source for patients, is likely to do more harm than good.

There is no previous study evaluating YouTube videos on PS exercises. This study will be the first in this respect. The main purpose of this study was to evaluate the quality and reliability of the most-viewed YouTube videos in PS exercises. The other purpose is to identify criteria that may be important for selecting high-quality and reliable videos.

MATERIALS AND METHODS

In the first phase of this descriptive study, a total of four search terms were determined. The keywords used to search videos were created by looking at previous studies on exercise and YouTube.[13-15] The keywords "piriformis syndrome exercise," "piriformis syndrome rehabilitation," "piriformis syndrome physical therapy," and "piriformis syndrome physiotherapy" were used to search YouTube (www.youtube.com) on November 28, 2021. Videos were sorted to show the most viewed videos first. Although there are studies examining all videos, many studies have evaluated the first 50 most-watched videos.[16-19] We similarly evaluated the first 50 most-watched videos for a total of 200 videos based on four keywords. All videos have been evaluated by a physician and physiotherapist experienced in PS exercises. If there was a difference between the scores of the two researchers, the researchers reevaluated the video together and made the final decision. In addition, a kappa analysis was performed for the

reliability of the research. For this, an independent observer group consisting of a physiotherapist and a doctor was formed, and the videos were also evaluated by this group, and the consistency of the results was evaluated with Cohen's kappa coefficient. Duplicated videos, videos on different topics, non-English videos, and videos with incomprehensible audio were excluded. Following the exclusion criteria, 92 videos were included in the analysis (Figure 1). Among the excluded videos, 72 were duplicated, eight were off topic, and 28 were not in English.

For all videos, the upload date, video duration, number of views, likes, comments, and the number of subscribers were recorded. The daily median values of some parameters were calculated by dividing the total values by the time from the day the video was uploaded till the day it was watched for evaluation.

Video sources are grouped under different titles in the literature.[16-18] In our study, video sources were grouped under four headings: (i) physicians, (ii) other healthcare professionals, (iii) independent users, and (iv) patients or patient associations.

The quality of the videos was assessed using the Global Quality Scale, an unverified but widely used scale that assesses the content quality and usefulness of online data.[20,21] If a total video score is 4 or 5 points, it is considered high quality, 3 points indicate medium quality, and 1 or 2 points indicate low quality (Table 1).[12]

The reliability of the videos was assessed with the modified DISCERN (mDISCERN) tool. This scale was originally created by Charnock et al.[22] and includes five questions. A high-reliability score for mDISCERN is 3 or greater (Table 2).[19,22]
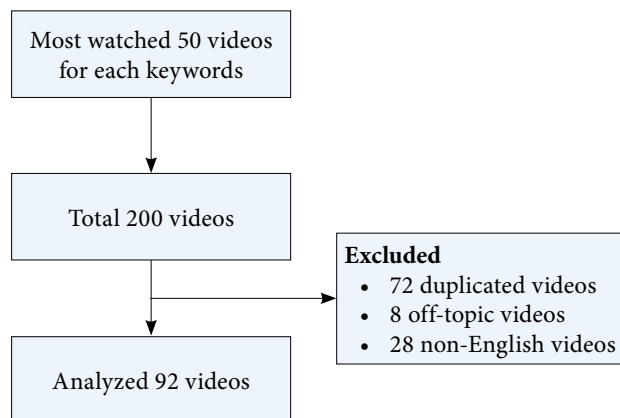

Figure 1. Study flowchart.

TABLE 1
Global Quality Scale

1	Poor quality, poor flow, most information missing, not helpful for patients
2	Generally poor, some information given but of limited use to patients
3	Moderate quality, some important information is adequately discussed
4	Good quality good flow, most relevant information is covered, useful for patients
5	Excellent quality and excellent flow, very useful for patients

TABLE 2
Modified DISCERN tool

1	Is the video clear, concise, and understandable?
2	Are valid sources cited?
3	Is the information provided balanced and unbiased?
4	Are additional sources of information listed for patient reference?
5	Does the video address areas of controversy/uncertainty?

Statistical analysis

Data were analyzed using the IBM SPSS version 21.0 software (IBM Corp., Armonk, NY, USA). Continuous variables were presented as median (minimum-maximum) values. Categorical variables were reported as number (n) and percentage (%). According to the normality test results, the Mann-Whitney U test was used in comparisons between two groups, and the Kruskal-Wallis test was used if the number of groups was more than two. Multiple comparison procedures were performed using the Dunn-Bonferroni approach to identify different groups after the Kruskal-Wallis test. The Pearson chi-square test, Fisher exact chi-square test, or the Fisher-Freeman-Halton test was used to compare categorical variables. The agreement between the two observer groups was examined by a kappa analysis, and Cohen's kappa coefficient was calculated. A p value of <0.05 was considered statistically significant.

RESULTS

An overview of the included videos is shown in Table 3. It was found that most of the videos were shared by other healthcare professionals (n=54, 58.7%). The median mDISCERN score was 3. Additionally, 18 (19.5%) of the evaluated videos were high quality, 45 (48.9%) were medium quality, and 29 (31.5%) were low quality.

TABLE 3
General features of the videos

	n	%	Median	Min-Max
Source of upload				
Physicians	20	21.7		
Other healthcare professionals	54	58.7		
Independent users	16	17.3		
Patients or patient associations	2	2.1		
Video features				
Duration (sec.)			365.50	44-1598
Total days posted on YouTube			1782.50	142-5110
Number of views			407,499	27,730-4,757,837
Number of likes			3650	55-121,000
Number of subscribers			226,000	213-12,200,000
Number of comments			200	0-5859
mDISCERN score			3	1-5
Global Quality Score				
Low quality	29	31.5		
Medium quality	45	48.9		
High quality	18	19.5		

mDISCERN: Modified DISCERN tool.

TABLE 4
Comparison of video sources and features according to reliability classification

	mDISCERN score <3 (n=23)				mDISCERN score ≥3 (n=69)				
	n	%	Median	Min-Max	n	%	Median	Min-Max	p
Video features									
Duration (sec)			253	47-1492			383	44-1598	0.055[a]
Total days posted on YouTube			2725	360-5110			1405	142-4745	0.001[a]
Number of subscribers			56,900	213-4,370,000			408,000	2490-12,200,000	0.001[a]
Number of views per day			0	0-0.04			0	0-0.04	0.783[a]
Number of likes per day			1.04	0.04-15.67			0.42	0.01-33.18	0.058[a]
Number of comments per day			10.94	0.68-223.57			5.66	0.20-1825.00	0.055[a]
Source of upload									
Physicians	0				20	28.9			0.004[b]
Other healthcare professionals	7	30.4			47	68.1			0.001[b]
Independent users	15	65.2			1	1.4			<0.001[c]
Patients or patient associations	1	4.3			1	1.4			0.440[c]

mDISCERN: Modified DISCERN tool; a: Mann Whitney U test; b: Pearson chi-square test; c: Fisher exact chi-square test.

The comparison of video parameters in terms of reliability groups is given in Table 4. In terms of reliability groups, there was a substantial agreement between the research team and the independent observer group (κ=0.75; p<0.001; Table 5).

There was no statistically significant difference between the reliability of the videos and the duration of the video, the median number of views per day, the median number of likes per day, and the median number of comments per day (p>0.05). Videos with more subscribers and less time since they were uploaded to YouTube were found to have high reliability (p<0.001). In addition, it was determined that most of the videos uploaded by physicians (p=0.004) and other healthcare professionals (p=0.001) were of high reliability. On the contrary, most videos uploaded by independent users were found to have low reliability (p<0.001) (Table 4).

Comparison of video parameters in terms of quality groups is presented in Table 6. In terms of quality groups, it was determined that there was a statistically significant and substantial agreement between the research team and the independent observer group (κ=0.72; p<0.001; Table 7).

When the features of the videos were compared between the high-, medium-, and low-quality videos, significant differences were determined in all evaluated video features (p<0.05; Table 6). In the subgroup analyses to determine the relationship between video features and quality groups, the total

TABLE 5
Evaluation of the agreement between the research team and the independent observer group in comparisons according to reliability classification

	Independent observer group					
	mDISCERN score <3		mDISCERN score ≥3		Total	
	n	%	n	%	n	%
Research team						
mDISCERN Score <3	17		6		23	25
mDISCERN Score ≥3	2		67		69	75
Total	19	21	73	79	92	100

mDISCERN: Modified DISCERN tool.

TABLE 6
Comparison of video sources and features according to quality classification

	Low quality (n=29)				Medium quality (n=45)				High quality (n=18)				p
	n	%	Median	Min-Max	n	%	Median	Min-Max	n	%	Median	Min-Max	
Video features													
Duration (sec)			261	44-1180			365	69-1492			710	214-1598	<0.001[a]
Total days posted on YouTube			2531	730-5110			1692	142-4745			880	270-3674	<0.001[a]
Number of subscribers			119,000	213-3,650,000			248,000	4500-12,200,000			784,500	6470-3,650,000	0.029[a]
Number of views per day			0.01	0-0.04			0	0-0.04			0	0-0.02	0.024[a]
Number of likes per day			1.2	0.07-33.18			0.45	0.03-17.51			0.09	0.01-1.03	<0.001[a]
Number of comments per day			25.06	0.86-1825			6.46	0.52-375.50			1.52	0.20-20.45	<0.001[a]
mDISCERN score													<0.001[b]
<3	17	73.9			6	26			0	0			
≥3	12	17.3			39	56.5			18	26			
Source of upload													
Physicians	5	25			13	65			2	10			0.236[b]
Other healthcare professionals	10	18.5			28	51.8			16	29.6			0.001[b]
Independent users	13	81.2			3	18.7			0	0			0.001[b]
Patients or patient associations	1	50			1	50			0	0			>0.99[c]

mDISCERN: Modified DISCERN tool; a: Kruskal-Wallis test; b: Pearson chi-square test; c: Fisher Freeman-Halton test.

TABLE 7
Evaluation of the agreement between the research team and the independent observer group in comparisons according to quality classification

Research team	Independent observer group							
	Low quality		Medium quality		High quality		Total	
	n	%	n	%	n	%	n	%
Low quality	24		3		2		29	31.5
Medium quality	1		39		5		45	48.9
High quality	0		5		13		18	19.5
Total	25	27.1	47	51	20	21.7	92	100

video duration of high-quality videos was found to be higher than low-and medium-quality videos (p<0.001 and p=0.009, respectively). In addition, the time elapsed after upload in the low-quality videos was found to be higher than medium-and high-quality videos (p=0.003 and p<0.001, respectively). Furthermore, it was determined that the number of subscribers of channels with low video quality was less than the number of subscribers of channels with medium-and high-quality videos (p=0.027 and p=0.019, respectively). In terms of viewing rate, the median number of views of low-quality videos was found to be higher than high-quality videos (p=0.019). In terms of the number of likes, the median number of likes for low-quality videos was higher than medium-and high-quality videos (p=0.015 and p<0.001, respectively). Finally, the median number of comments for low-quality videos was higher than medium- and high-quality videos (p=0.008 and p<0.001, respectively).

Significant differences were found between the mDISCERN scores and the quality groups (p<0.001; Table 6). It was determined that the videos in the groups with an mDISCERN score ≥3 were medium or high quality at a higher rate.

A statistically significant difference was found between the videos uploaded by other healthcare professionals and the quality groups (p=0.001; Table 6). Pairwise comparisons were made to establish from which group the difference originated. According to the results of the subgroup analysis, it was determined that the number of medium- and high-quality videos was higher than low-quality videos (p<0.05). In addition, there were more medium-quality videos than high-quality videos (p=0.037). A statistically significant difference was found between the videos uploaded by independent

users and the quality groups (p=0.001; Table 6). Pairwise comparisons were made to see which group caused the difference. According to the results of the subgroup analysis; the low quality videos was found to be higher than medium and high quality videos

DISCUSSION

In the current study, only 19.5% of the videos were high-quality videos, and the median mDISCERN score was 3. Kocyigit et al.[13] determined that 48.2% of the videos about ankylosing spondylitis exercises were high quality. In a study evaluating YouTube as a resource for patient information on dysphagia exercises and compensatory maneuvers, 54.9% of the videos were found to be high quality.[14] Erdem and Karaca[23] found that much of the information in the kyphosis videos was low quality and unreliable. In our study, we found that most of the videos about PS exercises are low or medium quality and highly reliable. There may be many reasons why the results of our study differ from other studies in the literature, and there is no clear judgment on this issue in the literature. First, although these are studies evaluating exercises in general, different subjects were evaluated in each study, and this may have led to different results. In addition, the parameters, particularly the video sources, vary among studies, which may have affected the results. Finally, the difference in the number of videos evaluated in studies may explain these conflicting results in the literature.

In the current study, it was determined that the reliability of the videos watched from the channels with more subscribers and the videos that are recently uploaded are higher. In addition, it was revealed that the videos uploaded by physicians and

other healthcare professionals are more reliable; on the contrary, the reliability of the videos uploaded by independent users is low. In a study evaluating YouTube as a source of medical information on epidural analgesia for labor pain, a total of 60 videos were evaluated, and the mean mDISCERN score was 1.9±1.3.[24] In this study, videos from medical sources were found to have a higher mDISCERN score than videos from nonmedical sources. Chang and Park[25] evaluated videos about epidural steroid injection on YouTube and found that only 22% of the videos were highly reliable, and these videos were uploaded by hospitals or physicians. In addition, none of the videos uploaded by media outlets and patients were found to be reliable. The results of our study generally support the current literature. As in other studies, videos uploaded by doctors and other healthcare professionals were found to be more reliable. In general, since the videos uploaded by health professionals are prepared by individuals with certain knowledge about medicine, the rate of misinformation is expected to be lower. Unlike the literature, recently uploaded videos were found to be more reliable in our study. Although there are no clear results in the current literature that the videos uploaded recently are more reliable, we think that due to the increasing interest in YouTube and other social platforms, many healthcare professionals produce contents on these platforms, increasing the reliability of the videos. Moreover, the success of channels with more subscribers may be attributed to reliable and useful videos uploaded. In our study, unlike the literature, we think that the more recently uploaded videos and the videos in channels with more subscribers are successful due to their reliability.

In our study, when the quality of the videos are evaluated according to the uploading sources, it was determined that the main sources of high-quality videos are physicians and other healthcare professionals, while the main sources of low-quality videos are independent users. Additionally, most of the highly reliable videos were medium or high quality. We also found that parameters related to video features affect video quality. One study determined that video quality was associated with daily dislikes and mDISCERN scores, and higher quality videos were more reliable.[13] In the same study, no relationship was found between other video features and quality. Romano et al.,[26] in a study evaluating lichen planus-related videos, found that DISCERN and Global Quality Scale scores were positively related to video length but not to other video features. We think that the higher quality of the videos uploaded by physicians and other health professionals in our study is compatible with the literature. In addition, similar to the literature, higher-quality videos were found to be more reliable. However, unlike the literature, video features and video quality were found to be related in our study. We believe that this relationship may be related to the video selection method. We analyzed the 50 most viewed videos for each keyword. Analyzing the videos on YouTube according to each keyword could alter the results.

This study has several limitations. First, we evaluated the videos at a certain time of the day; however, since YouTube has a dynamic structure, the views, likes, and other features of the videos change momentarily. In addition, the results are difficult to generalize to all populations since only English videos were sampled.

In conclusion, exercise practices are crucial in PS treatment. In this study, most of the videos about PS exercises available on YouTube were found to be of high reliability but low or medium quality. In addition, it was determined that many factors, particularly upload sources, are effective in detecting high-quality and reliable videos on YouTube. Considering that there are so many misleading videos on YouTube, the accuracy of patients' use of YouTube videos to get information is debatable. However, it would be beneficial for physicians and other health professionals to upload more videos so that individuals can reach more reliable and higher-quality information about diseases.

REFERENCES

1. Probst D, Stout A, Hunt D. Piriformis syndrome: A narrative review of the anatomy, diagnosis, and treatment. PM R 2019;11 Suppl 1:S54-S63.

2. Kirschner JS, Foye PM, Cole JL. Piriformis syndrome, diagnosis and treatment. Muscle Nerve 2009;40:10-8.

3. Kean Chen C, Nizar AJ. Prevalence of piriformis syndrome in chronic low back pain patients. A clinical diagnosis with modified FAIR test. Pain Pract 2013;13:276-81.

4. Shah SS, Consuegra JM, Subhawong TK, Urakov TM, Manzano GR. Epidemiology and etiology of secondary piriformis syndrome: A single-institution retrospective study. J Clin Neurosci 2019;59:209-12.

5. Jankovic D, Peng P, van Zundert A. Brief review: Piriformis syndrome: Etiology, diagnosis, and management. Can J Anaesth 2013;60:1003-12.

6. Cassidy L, Walters A, Bubb K, Shoja MM, Tubbs RS, Loukas M. Piriformis syndrome: Implications of anatomical variations, diagnostic techniques, and treatment options. Surg Radiol Anat 2012;34:479-86.

7. Keskula DR, Tamburello M. Conservative management of piriformis syndrome. J Athl Train 1992;27:102-10.

8. Han SK, Kim YS, Kim TH, Kang SH. Surgical treatment of piriformis syndrome. Clin Orthop Surg 2017;9:136-44.

9. Crabb RM, Rafie S, Weingardt KR. Health-related internet use in older primary care patients. Gerontology 2012;58:164-70.

10. Li M, Yan S, Yang D, Li B, Cui W. YouTube™ as a source of information on food poisoning. BMC Public Health 2019;19:952.

11. Ozsoy-Unubol T, Alanbay-Yagci E. YouTube as a source of information on fibromyalgia. Int J Rheum Dis 2021;24:197-202.

12. Kocyigit BF, Akaltun MS, Sahin AR. YouTube as a source of information on COVID-19 and rheumatic disease link. Clin Rheumatol 2020;39:2049-54.

13. Kocyigit BF, Nacitarhan V, Koca TT, Berk E. YouTube as a source of patient information for ankylosing spondylitis exercises. Clin Rheumatol 2019;38:1747-51.

14. Chang MC, Park D. YouTube as a source of patient information regarding exercises and compensated maneuvers for dysphagia. Healthcare (Basel) 2021;9:1084.

15. Villafañe JH, Cantero-Tellez R, Valdes K, Usuelli FG, Berjano P. Educational quality of YouTube videos in thumb exercises for carpometacarpal osteoarthritis: A search on current practice. Hand (N Y) 2018;13:715-9.

16. Aydin MA, Akyol H. Quality of information available on YouTube videos pertaining to thyroid cancer. J Cancer Educ 2020;35:599-605.

17. Karakoyun A, Yildirim A. YouTube videos as a source of information concerning Behçet's disease: A reliability and quality analysis. Rheumatol Int 2021;41:2117-23.

18. Baker DM, Marshall JH, Lee MJ, Jones GL, Brown SR, Lobo AJ. YouTube as a source of information for patients considering surgery for ulcerative colitis. J Surg Res 2017;220:133-8.

19. Langford B, Hooten WM, D'Souza S, Moeschler S, D'Souza RS. YouTube as a source of medical information about spinal cord stimulation. Neuromodulation 2021;24:156-61.

20. Kunze KN, Cohn MR, Wakefield C, Hamati F, LaPrade RF, Forsythe B, et al. YouTube as a source of information about the posterior cruciate ligament: A content-quality and reliability analysis. Arthrosc Sports Med Rehabil 2019;1:e109-e114.

21. Ng CH, Lim GRS, Fong W. Quality of English-language videos on YouTube as a source of information on systemic lupus erythematosus. Int J Rheum Dis 2020;23:1636-44.

22. Charnock D, Shepperd S, Needham G, Gann R. DISCERN: An instrument for judging the quality of written consumer health information on treatment choices. J Epidemiol Community Health 1999;53:105-11.

23. Erdem MN, Karaca S. Evaluating the accuracy and quality of the information in kyphosis videos shared on YouTube. Spine (Phila Pa 1976) 2018;43:E1334-E1339.

24. D'Souza RS, D'Souza S, Sharpe EE. YouTube as a source of medical information about epidural analgesia for labor pain. Int J Obstet Anesth 2021;45:133-7.

25. Chang MC, Park D. YouTube as a source of information on epidural steroid injection. J Pain Res 2021;14:1353-7.

26. Romano A, Lauritano D, Fiori F, Di Petrillo M, Hasan I, Lucchese A, et al. Cross-sectional study on the quality of oral lichen planus videos on YouTube™. J Oral Pathol Med 2021;50:220-8.