

YouTube as a Source of eHealth: Is It Beneficial for Lumbar Disc Herniation Exercises?

E-Sağlık Kaynağı Olarak YouTube: Lomber Disk Hernisi Egzersizleri İçin Faydalı mı?

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ABSTRACT Objective: Lumbar disc herniation is a common disorder that causes pain and disability. Application of certain exercises plays a major role in non-surgical treatment choices. Internet use for obtaining health-related information has significantly increased. YouTube is a major source of health-related videos worldwide. The aim of the current paper is to evaluate the quality of the most viewed YouTube videos in lumbar disc herniation exercises. **Material and Methods:** The key terms 'lumbar disc herniation exercise, lumbar disc herniation rehabilitation, lumbar disc herniation physical therapy and lumbar disc herniation physiotherapy' were used for searching the videos. The reliability of the videos was evaluated using the modified DISCERN tool. The quality of the videos in terms of education was assessed using the Global Quality Scale (GQS). According to GQS scores, three groups were formed: good/excellent quality, moderate, and poor quality. **Results:** Of the videos, 36.4% (n=28) were of good/excellent quality, 35.1% (n=27) were moderate, and 28.5% (n=22) were of poor quality. Good/excellent videos had a significantly higher median DISCERN score than videos of moderate and poor quality (p<0.0001). On the other hand, there were no significant differences in median views per day (p=0.896), comments per day (p=0.483), and like ratios (p=0.119) according to video quality. **Conclusion:** Although YouTube hosts a large amount of data on healthcare, some of this information is incorrect or of poor quality. Physicians should refer patients to the accurate online resources and clarify the importance of online resource assessment.

Keywords: YouTube; e-Health; lumbar disc herniation; exercise; rehabilitation

ÖZET Amaç: Lomber disk herniasyonu ağrı ve sakatlığa neden olan yaygın bir hastalıktır. Belirlenmiş egzersizlerin uygulanması cerrahi olmayan tedavi seçenekleri içerisinde önemli bir yere sahiptir. Sağlıkla ilgili bilgi elde etmek için internet kullanımı önemli ölçüde artmıştır. YouTube, dünya çapında sağlıkla ilgili önemli bir video kaynağıdır. Mevcut makalenin amacı, lomber disk herniasyonu egzersizlerinde en çok izlenen YouTube videolarının kalitesini değerlendirmektir. **Gereç ve Yöntemler:** Videoları aramak için 'lomber disk hernisi egzersizi, lomber disk hernisi rehabilitasyonu, lomber disk hernisi fizik tedavisi ve lomber disk hernisi fizyoterapisi' anahtar terimleri kullanılmıştır. Videoların güvenilirliği değiştirilmiş DISCERN aracı kullanılarak değerlendirildi. Videoların eğitim açısından kalitesi Global Kalite Ölçeği (GKÖ) kullanılarak değerlendirildi. GKÖ skorlarına göre üç grup oluşturuldu: iyi/mükemmel kalite, orta kalite ve düşük kalite. **Bulgular:** Videoların %36.4'ü (n=28) iyi/mükemmel kalitede, %35.1'i (n=27) orta ve %28.5'i (n=22) düşük kalitede idi. İyi/mükemmel videolar orta ve kötü kalitede videolardan anlamlı olarak daha yüksek medyan DISCERN skoruna sahipti (p<0.0001). Diğer yandan, video kalitesine göre günlük medyan görüntülemeler (p=0.896), günlük yorumlar (p=0.483) ve beğenme oranları (p=0.119) arasında anlamlı bir fark yoktu. **Sonuç:** YouTube sağlık hizmetleri hakkında büyük miktarda veri barındırmasına rağmen, bu bilgilerin bir kısmı yanlış veya düşük kalitededir. Doktorlar hastaları doğru çevrimiçi kaynaklara yönlendirmeli ve çevrimiçi kaynak değerlendirmesinin önemini açıklığa kavuşturmalıdır.

Anahtar Kelimeler: YouTube; e-sağlık; lomber disk hernisi; egzersiz; rehabilitasyon

The displacement of disc material beyond the intervertebral disc space is defined as disc herniation. Lumbar disc herniation (LDH) is one of the most

common disc herniation types and it is thought to affect at least 1% of the population.^{1,2} LDH may lead to chronic low back pain and radiculopathy.³ Sympto-

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matic LDH could be aptly treated both with surgery and conservative treatments.⁴ In the majority of patients, conservative treatment such as physical therapy and exercise programmes are offered as the first line of treatment for pain relief and amelioration of functional and neurologic deficits.⁵ Several exercise programmes such as aerobic activity, strength exercises, motor control and core stability exercises are available for the treatment of symptomatic LDH.⁶⁻⁹ However, the exercises are beneficial if they are performed correctly with the appropriate duration and number of repetitions. This reveals the importance of compliance with the specified exercise programs.¹⁰

The widespread use of the internet in society has created major changes in the ways of communication and receiving information. It has been shown that internet use for obtaining health-related information has significantly increased.¹¹ Internet-based information has been reported to influence the decisions and treatment choices of 75% of patients with chronic diseases.¹² YouTube includes a large number of videos on the pathogenesis, prevention, diagnosis, and **treatment** options of several health problems.¹³⁻¹⁶ However, some concerns may emerge from obtaining health-related information from online sources. YouTube does not include a regulator mechanism to control the quality of content of the uploaded videos. Anyone can upload videos to YouTube easily and freely, which may cause the dissemination of incorrect or incomplete health-related information. On the other hand, visual components and videos may be beneficial in patients' learning and practice of exercise therapies.

Many different diseases, including LDH, cause low back pain. There may be differences in exercise programs in diseases presenting with low back pain such as spinal stenosis, lumbar spondylosis, ankylosing spondylitis and LDH. Therefore, we considered that choosing a specific disease causing low back pain would allow us to evaluate the exercises more accurately. There are several studies evaluating the quality of information on LDH and low back pain presented on websites.¹⁷⁻¹⁹ Additionally, YouTube videos related to various diseases were evaluated in different studies, but there is no published research that investigates YouTube videos on LDH exer-

cises.^{12,20} Therefore, our purpose in this study was to analyze YouTube videos related to LDH exercises with specific aims to determine the quality of the information in the videos and to define which sources provided high quality health-related information.

MATERIAL AND METHODS

This study is planned in a descriptive design. Researchers discussed possible key words before the study and decided four key terms for searching of videos on YouTube. The key terms *lumbar disc herniation exercise*, *lumbar disc herniation rehabilitation*, *lumbar disc herniation physical therapy* and *lumbar disc herniation physiotherapy* were used on YouTube (www.youtube.com) to determine videos to be included in the study on September 5th, 2018. The videos were sorted according to their view counts. This search method allows the most viewed videos to be listed on the first page. The number of videos to be evaluated was determined by considering similar studies in the literature.^{13,21,22} Although there are studies evaluating all videos, the most common method was to take a fixed sample size.²³ Additionally, previous research revealed that over 90 percent of users reviewed videos on the first 3 pages of query results.²⁴ Therefore, the videos on the first three pages (60 videos) for each key term were included. Exclusion criteria of videos were determined as being in a language other than English, being off-topic (videos presenting exercises related to a disease other than LDH, videos that provide information about aspects other than LDH exercises (eg, pathogenesis of the LDH, surgical treatment options, spinal colon anatomy), videos created for the purpose of selling commercial products, videos created for advertising, and videos that do not present any exercise or duplicate.

ASSESSMENT OF QUALITY

The quality of the videos regarding their educational value was assessed using the Global Quality Scale (GQS). In similar studies, quality assessments were performed using the GQS.^{13,16,21,25} Quality assessments were based on the GQS which is partially modified to fit the topic. The GQS is an evaluation tool for web-based sources which is a five-point scale with a minimum score of 1 and a maximum score of 5

points. With this scale, researchers evaluate the flow, usefulness, and quality of videos. A video scoring 4 or 5 points, is considered as good/excellent quality, 3 points is considered as moderate quality, and 1 or 2 points is considered as poor quality. The following scoring system is used in this study:

- A score of 1 point indicates that the video is of poor quality, of poor flow, and missing the most information and, therefore not useful for patients. In these videos, the exercises that should not be used in conservative treatment of LDH are presented. Additionally, exercises presented in these videos may worsen the LDH clinic.

- A score of 2 points indicates that the video is generally of poor quality; although some information is given, it has limited use for patients. While the content of these videos includes largely inappropriate exercises, this group of videos presents a few correct exercises. Videos provide a small amount of accurate information about LDH related exercises, but incorrect information is dominant.

- A score of 3 points indicate that the video is of moderate quality, and some important information is sufficiently discussed. In these videos, accurate and incorrect exercises are presented in a balanced manner. High-quality information and misleading information is provided together. The recommended exercise programs include partial errors. Errors in the videos are not dominant.

- A score of 4 points indicates that the video shows good quality, good flow and is useful for patients and covering the most relevant information. The videos present the correct exercises to a large extent but include minor deficiencies. Exercises presented in the videos are beneficial for patients and videos do not include major mistakes.

- A score of 5 points indicates the video is of excellent quality and excellent flow, and is very useful for patients. The videos include completely accurate exercises. The number of repetitions and exercise durations are explained in detail. Common mistakes performing during exercises are mentioned.²⁶

All videos included in the study were evaluated by two physicians experienced in LDH exercises and rehabilitation (BFK, MSA). Inter-rater consistency

was assessed using the kappa coefficient. When there was inconsistency between the assessments of the physicians, a third physician (AA) reviewed the video and the evaluation was finalized.

ASSESSMENT OF RELIABILITY

The reliability of the videos were evaluated using the modified DISCERN tool (DS). Charnock et al.²⁷ created original form of the DS tool. The original version includes 16 questions. Reliability is evaluated with the first 8 questions, quality is evaluated with the next 7 questions and last question provides overall quality rating. The modified DS was adapted from original version to evaluate the reliability.²⁵ The modified DS tool includes five questions:

- Is the video clear, concise and understandable?
- Are reliable sources of information used (form valid researches, physiatrists or physiotherapists)?
- Is the information presented balanced and unbiased?
- Are additional sources of information listed for patient reference?
- Are areas of uncertainty/controversy mentioned?

Questions are answered as yes or no. Each yes answer counts as 1 point and no answer 0 point. The total score is ranging between a minimum score of 0 and a maximum score of 5. Higher scores indicate increased reliability. Similar methodology was used to evaluate reliability in similar studies regarding YouTube videos.^{13,21,25,28,29}

VIDEO PARAMETERS

Upload date, video duration, view counts, likes, dislikes, and comments were recorded for all videos. Values for per day were calculated by dividing the total number of views and comments by the total number of days on YouTube. Like ratio was calculated as like/[like+dislike].

VIDEO SOURCES

Videos sources were categorized in six titles: (1) trainer, (2) physician, (3) health-related website, (4) academic, (5) independent user, (6) non-physician health personnel.

ETHICS STATEMENT

In this study, only videos which are publicly available on YouTube were assessed and no human participants or animals were included. For this reason, ethics committee approval was not required for this study. Similar studies have also followed the same path.^{13,30,31}

INFORMED CONSENT

Informed consent is not necessary due to the nature of this study. YouTube videos were evaluated in this study.

STATISTICAL ANALYSIS

Statistical Package for the Social Sciences version 20.0 package program (SPSS Inc., Chicago, IL, USA) was used for data analyses. Number, percentage, and median (minimum-maximum) values are used for descriptive data. The Shapiro-Wilk test was used to assess normality. The quantitative variables between the groups were compared using the Kruskal-Wallis test. The agreement between the two physicians was assessed using the kappa coefficient. $p < 0.05$ was considered as significant.

RESULTS

After applying the eligibility criteria, 66 videos that were off-topic, 93 videos that were duplicate, and 4 videos that were non-English were excluded; a total of 77 videos were examined out of 240 videos.

The median duration of the videos was 4.5 (min=0.86-max=139.88) minutes. The median view count and number of comments were 115,985 (min=938-max=2402088) and 51 (min=0-max=3581), respectively. The general features of the videos are presented in Table 1.

TABLE 1: General features of videos.

Video features	Median (min-max)
Duration (Seconds)	270 (52-8399)
View count	115,985 (938-2,402,088)
Number of comments	51 (0-3581)
Total likes	633 (0-64,000)
Total dislikes	40 (0-1200)

Min: minimum, max: maximum.

Of the videos, 36.4% (n=28) were of good/excellent quality, 35.1% (n=27) were moderate, and 28.5% (n=22) were of poor quality according to GQS. The kappa score for inter-rater agreement was 0.69. Of the videos, 57.1% (n=4) produced by academics were of good/excellent quality. On the other hand, 80.0% (n=4) of the videos produced by independent users were of poor quality. The distribution of video quality groups according to the uploading sources were presented in Table 2.

The highest median GQS (median 4, min=3-max=5) and DS (median 4, min=1-max=5) were received from videos uploaded by academics. On the other hand, the highest median views per day (median 176.114, min=42.89-max=7625.68) and comments per day (median 0.161, min=0.02-max=11.37) were achieved by videos uploaded by trainers. There were significant differences in median GQS ($p=0.009$), DS ($p<0.0001$), views per day ($p=0.027$) and comments per day ($p=0.002$) according to video sources. However, there was no significant difference in like ratios ($p=0.106$) according to the video sources (Table 3).

Good/excellent videos had a significantly higher median DS than videos of moderate and poor quality

TABLE 2: Categorization of the videos according to sources, n (%).

Source	Poor quality	Moderate quality	Good/excellent quality	Total
Trainer	4 (36.4)	5 (45.4)	2 (18.2)	11
Physician	4 (36.4)	7 (41.2)	7 (41.2)	17
Health-related website	3 (17.6)	4 (20)	6 (30)	20
Academic	0 (0)	3 (42.9)	4 (57.1)	7
Independent user	4 (80)	0 (0)	1 (20)	5
Non-physician health personnel	1 (5.9)	8 (47.1)	8 (47.1)	17

n: number, %: percentage.

TABLE 3: GQS, DS, views per day, comments per day, and like ratio of videos according to video source.

Video source	GQS ^a	DS ^b	Views per day ^c	Comments per day ^d	Like ratio ^e
	Median (min-max)	Median (min-max)	Median (min-max)	Median (min-max)	Median (min-max)
Trainer	3 (1-4)	2 (0-3)	176.114 (42.89-7625.68)	0.161 (0.02-11.37)	0.965 (0.54-0.99)
Physician	3 (2-5)	3 (2-4)	121.814 (0.74-1619.27)	0.075 (0-0.081)	0.966 (0.089-1)
Health-related websites	2.5 (1-4)	1.5 (0-5)	37.351 (0.56-552.71)	0.006 (0-0.1)	0.937 (0-1)
Academic	4 (3-5)	4 (1-5)	82.139 (18.62-2767.43)	0.029 (0-10.63)	0.91 (0.49-0.97)
Independent user	2 (1-4)	1 (0-2)	114.322 (2.12-1229.46)	0.147 (0-0.5)	0.955 (0.9-0.97)
Non-physician health personnel	3 (1-5)	2 (0-5)	127.832 (1.25-1314.98)	0.075 (0-0.8)	0.964 (0.43-1)

^a: p=0.009, ^b: p<0.0001, ^c: p=0.027, ^d: p=0.002, ^e: p=0.106.

GQS: Global Quality Scale, DS: Modified DISCERN Tool, min: minimum, max: maximum.

TABLE 4: DS, views per day, comments per day and like ratio of videos according to video quality.

Video quality	DS ^a	Views per day ^b	Comments per day ^c	Like ratio ^d
	Median (min-max)	Median (min-max)	Median (min-max)	Median (min-max)
Poor	1 (0-3)	93.693 (2.12-1229.46)	0.021 (0-0.5)	0.935 (0.13-1)
Moderate	2 (1-4)	75.938 (1.25-7625.68)	0.04 (0-11.37)	0.956 (0.43-1)
Good/excellent	4 (2-5)	84.043 (0.56-2561.85)	0.087 (0-3.13)	0.964 (0-1)

^a: p<0.0001, ^b: p=0.896, ^c: p=0.483, ^d: p=0.119.

DS: Modified DISCERN Tool, min: minimum, max: maximum.

(p<0.0001). On the other hand, there were no significant differences in median views per day (p=0.896), comments per day (p=0.483), and like ratios (p=0.119) according to video quality (Table 4).

DISCUSSION

Our results demonstrate that more than one-third of YouTube videos on LDH exercises were of good/excellent quality. Videos provided by academics, non-physician health-personnel, and physicians were the main sources of good/excellent quality videos. On the other hand, the main sources of poor quality videos were independent user and health-related website. No significant difference was found in views per day, comments per day, and like ratios among the video quality groups.

Of the videos, 36.4% (n=28) were of good/excellent quality, 35.1% (n=27) were of moderate quality, and 28.5% (n=22) were of poor quality according to GQS. Green et al.¹⁷ evaluated information quality related to LDH on websites and around 10% of websites were found to present high-quality information. Ferreira et al. reported that 43.3% of recommenda-

tions about low back pain presented on websites were accurate.¹⁸ Costa et al. evaluated websites presenting information about low back pain on three different dates (2010, 2015, and 2018) and reported that poor quality websites increased during this period.¹⁹ In 2018, 86% of websites were of poor quality. In the studies evaluating YouTube videos on different diseases, various proportions of good quality or useful videos were found. In some studies, more than 50% of videos have been reported to be useful, but there are also studies reporting much lower useful or good quality videos.^{21,25,29,32,33} There may be various reasons for the differences in the above-mentioned studies. First, studies have been conducted on different diseases or situations such as retinopathy of prematurity, diabetes, rheumatoid arthritis, methotrexate self-injection technique, and thumb exercises for carpometacarpal osteoarthritis. Secondly, the assessment of videos is subjective and different criteria may have been used in the evaluations. Lastly, the differences in the number of videos included in the studies may have caused these results. Our results suggest that YouTube should be considered as a mixed pool including good, moderate, and poor quality videos.

Primary sources of good quality videos were academics, non-physician health-personnel, and physicians. On the other hand, the main sources of poor quality videos were independent users, health-related websites, and trainers. No video produced by an academic was of poor quality. Consistently with our results, Sajadi et al. reported that 64% of useful videos were produced by healthcare professionals or organizations.³⁴ Singh et al. demonstrated that 73.9% of videos that came from medical advertisements and for-profit organizations were of poor quality.²⁵ Şahin et al. stated that videos produced by independent users had lower quality than videos from healthcare professionals.³² Our results reveal the importance of source when searching videos to obtain health-related information from YouTube. The source of the video should be taken into account when using YouTube to obtain health-related information. Universities, academics, physicians, and professional organizations should be supported and motivated to produce videos that provide accurate, useful, instructive, and unbiased medical information. Moreover, these videos should be accessible to patients on video-sharing websites such as YouTube and social networks. Physicians should inform patients about the importance of video source when acquiring information from the internet.

We assessed the reliability of videos using the DS. Good/excellent videos had a significantly higher median DS. Our results show that good/excellent quality videos according to GQS are more reliable videos. The number of views is one of the major parameters that indicate the popularity level of YouTube videos. In our study, no significant difference was detected between good, moderate, and poor-quality videos in terms of views per day, comments per day, and like ratios. Additionally, videos provided by trainers are the most viewed and commented per day. On the other hand, only 18.2% of the videos sourced by trainers were of good/excellent quality. Similarly to our results, Singh et al., Shepherd, and Murugiah et al. reported no significant differences in number of views per day according to video quality levels.^{25,35,36} Dubey et al. stated that misleading and poor quality videos were viewed more often than useful videos.³⁷ Our results suggest that view count per day, number of comments per day,

and like ratio are not indicators of video quality and reliability. Internet users may have difficulty in choosing videos that are of more quality and reliability, and thus they may not watch videos that include useful, reliable, accurate, and unbiased information.

This study has some limitations. YouTube videos were evaluated in a single snapshot. YouTube has a dynamic structure and over time new videos that may change the results are added, commented upon, and viewed. We did not record the scores for each item on the scales. Video searches were made only in English. Although various key terms were used, some videos could not be enrolled in the study. However, the aim our study was to reveal the general tendency of YouTube videos in terms of LDH exercises. It should be noted that location and previous activity on the internet may affect search results on YouTube. For this reason, each internet user has the possibility to see different video lists on YouTube.

CONCLUSION

Patients are increasingly referring to the internet to better understand their medical condition and treatment, and to make informed decisions about their diseases. It is evident that YouTube has provided many opportunities for internet users to gain information on their health care. Although YouTube hosts a large amount of data on healthcare, some of this information is incorrect or of poor quality. Physicians, if necessary, should refer their patients to internet-based resources that provide high-quality information, and clarify to patients that not every resource on the internet provides high-quality information. The importance of online resource evaluation should be explained to patients and education on this issue should be provided. Academics, professional organizations, universities, and health professionals should upload videos to YouTube and actively use video sharing sites to ensure that internet users can access more convenient, high-quality, and accurate information.

Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

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