ORIGINAL ARTICLE

YouTube as an Information Source for Pulmonary Rehabilitation in Patients with COVID-19: A Cross-Sectional Study

COVID-19 Hastalarında Pulmoner Rehabilitasyon İçin Bir Bilgi Kaynağı Olarak YouTube: Kesitsel Bir Çalışma

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ABSTRACT

Introduction: Impaired lung function and decreased exercise capacity may have been in COVID-19. Therefore, the importance of pulmonary rehabilitation stands out. YouTube has been used often for information about health. The aim of the study is to evaluate the content and the quality of YouTube videos of pulmonary rehabilitation in COVID-19.

Method: In this cross-sectional study, the keywords were determined and searched in YouTube by two researchers. A total of 282 videos were watched. Video sources, contents, duration, view number, likes, dislikes, and comments were recorded. For assessment of quality, the Global Quality Scale (GQS) and for reliability the Modified DISCERN reliability tool was used.

Results: After application of inclusion and exclusion criteria, a total of 135 videos were analyzed. According to the GQS, 27 (20%) of videos were low, 47 (34.8%) of medium, and 61 (45.2%) of high-quality. Non-physician Health personnel shared the most videos (31.1%). The high-quality video source was Non-physician health personnel, Physician, Academic/university, and Health-related website. There was a statistically significant difference in DISCERN score between quality groups and the highest score was in the high-quality group (p<0.001). There was no statistically significant difference in groups between video parameters. When the video content was examined, 81.5% had the information about COVID-19, 77% had the importance of pulmonary rehabilitation in COVID-19 and the most mentioned contents were diaphragmatic breathing and thoracic expansion.

Conlusion: Health professionals should create more videos for internet users to access high-quality, reliable videos. Viewers are advised to prefer videos prepared by health professionals, rather than parameters such as the video duration, number of views, likes, dislikes, and comments.

Key words: COVID-19, pulmonary rehabilitation, youtube

ÖZ

Giriş: Bozulmuş akciğer fonksiyonu ve azalmış egzersiz kapasitesi COVID-19'da görülmüş olabilir. Bu nedenle pulmoner rehabilitasyonun önemi öne çıkmaktadır. YouTube, sağlıkla ilgili bilgiler için sıklıkla kullanılmaktadır. Çalışmanın amacı, COVID-19'da pulmoner rehabilitasyona ilişkin YouTube videolarının içeriğini ve kalitesini değerlendirmektir.

Yöntem: Kesitsel tipteki bu çalışmada, anahtar kelimeler iki araştırmacı tarafından YouTube'da belirlenmiş ve aranmıştır. Toplam 282 video izlendi. Video kaynakları, içerikleri, süresi, izlenme sayısı, beğeniler, beğenmemeler ve yorumlar kaydedildi. Kalitenin değerlendirilmesi için Global Kalite Ölçeği (GQS) ve güvenilirlik için Modifiye DISCERN güvenilirlik aracı kullanıldı.

Bulgular: Dahil etme ve hariç tutma kriterlerinin uygulanmasından sonra toplam 135 video analiz edildi. GQS'ye göre, videoların 27'si (%20) düşük, 47'si (%34,8) orta ve 61'i (%45,2) yüksek kaliteliydi. En çok videoyu hekim dışı sağlık personeli paylaştı (%31,1). Yüksek kaliteli video kaynağı Doktor olmayan sağlık personeli, Doktor, Akademik/üniversite ve Sağlıkla ilgili web sitesiydi. Kalite grupları arasında DISCERN skorunda istatistiksel olarak anlamlı bir fark vardı ve en yüksek skor yüksek kalite grubundaydı (p<0,001). Gruplar arasında video parametreleri arasında istatistiksel olarak anlamlı bir fark yoktu. Video içeriği incelendiğinde %81,5'inin COVID-19 ile ilgili bilgilere sahip olduğu, %77'sinin COVID-19'da pulmoner rehabilitasyonun önemine sahip olduğu ve en çok bahsedilen içeriklerin diyafragma solunumu ve torasik genişleme olduğu görüldü.

Sonuç: Sağlık profesyonelleri, internet kullanıcılarının yüksek kaliteli, güvenilir videolara erişmesi için daha fazla video oluşturmalıdır. İzleyicilerin video süresi, izlenme sayısı, beğeni, beğenmeme, yorum gibi parametreler yerine sağlık profesyonelleri tarafından hazırlanan videoları tercih etmeleri önerilir.

Anahtar Kelimeler: COVID-19, pulmoner rehabilitasyon, youtube

Introduction

Coronavirus (COVID-19) was first seen in December 2019 in the city of Wuhan in China's Hubei province. The virus was entitled as severe acute respiratory syndrome Coronavirus-2 (SARS-CoV-2) by the International Virus Taxonomy Committee (ICTV) and the disease caused by this viral infection was called COVID-19. A pandemic was declared by the World Health Organization on March 11, 2020 (1).

COVID-19 disease can cause clinical conditions ranging from mild flu-like upper respiratory symptoms to severe pneumonia, which is life-threatening and in need of mechanical ventilation (2, 3). In studies, impaired lung function and decreased exercise capacity was detected in people infected with COVID-19 in long-term follow-up after recovery (4, 5). Therefore,

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it is recommended that patients who are infected with COVID-19 should commence a pulmonary rehabilitation program (6, 7).

Pulmonary rehabilitation should be planned by creating an individualized treatment protocol for each COVID-19 patient in addition to pulmonary rehabilitation components such as education and information about the disease, regulation of nutrition, strengthening of respiratory muscles, and aerobic exercises (8). These treatments intend to minimize the resistance of respiratory paths, improve the symptoms such as cough and dyspnea, improve lung capacity, reduce disability, reduce anxiety and depression and improve the quality of life (9).

With the spread of online platforms, people have tended to use the internet more to get health-related information. YouTube is one of the most popular social platforms with more than two billion users (10, 11). With these videos presented by physicians and non-physician health professionals through visual and audio means, users can access accurate and reliable medical information free of charge. However, regardless of the knowledge of education and expertise, all users can share any information about health issues, and thus the video sources may contain incorrect and misleading information (10, 12). Sharing accurate and reliable YouTube-based information about pulmonary rehabilitation in people withCOVID-19, even if it contributes to the importance of pulmonary rehabilitation, exercise therapy, and repeatability, if there are misleading and complex information, it may cause disability, anxiety, and spread of the disease. And in addition to all these, the need to get information from online platforms has increased due to home quarantine, the fear of going to the hospital with the thought of getting infected, and the difficulty of reaching the pulmonary rehabilitation unit.

The aim of this study is to evaluate the quality of YouTube videos related to pulmonary rehabilitation in COVID-19, to examine the video content, and to determine the frequency of exercises shown in these videos.

Materials and Methods

Data collection and video selection

This cross-sectional study was conducted without the approval of the ethics committee since there were no human participants or animal subjects. A search was performed on https://www.youtube.com/ on 15.04.2021. Videos that were available to anyone were analyzed.The study included English videos with high image and sound quality. Irrelevant videos, duplicate videos, non-English videos, advertising videos, videos with poor audio and video quality were excluded. In the study, search words are discussed by two independent evaluators, who specialize in

physical medicine and rehabilitation (CK, YGD) and determined by the joint decision. The keywords were 'COVID-19 pulmonary rehabilitation', 'pulmonary rehabilitation in COVID-19, 'post COVID-19pulmonary rehabilitation', 'breathing techniques for COVID-19', 'coronavirus pulmonary rehabilitation', COVID-19 lung rehabilitation'.

Although in previous studies the first three or five pages were scanned for each search term and videos were examined (13-15), in this study all videos for each search word were included. Since YouTube is a dynamic platform, the search results have been saved to a file in need for future analysis.

Video parameters and video sources

Upload date, video duration, number of views, likes, dislikes, and comments of the videos were recorded. In this context, daily rates (duration per day, view per day, likes per day, dislikes per day, comments per day) were calculated by dividing these parameters by a total number of days. The videos are categorized according to sources as (1) physician, (2) nonphysician health personnel, (3) academic/university, (4) health-related website, (5) patient/independent user, (6) trainer, (7) society/non-profit organization.

Determining the video content

The videos were classified according to whether they contained information about COVID-19, the importance of pulmonary rehabilitation in COVID-19, the psychological effect of COVID-19, bronchial hygiene techniques, diaphragmatic breathing techniques, pursed-lip breathing technique, thoracic expansion exercises, other controlled breathing techniques, respiratory muscles strengthening exercises, upper extremity strengthening exercises, and aerobics.

Assessment of quality and reliability

The Global Quality Scale was used for the assessment of the educational quality of the YouTube videos. The Global Quality Scale is an assessment tool for internet resources. The Global Quality Scale is a scale scored from 1 to 5, with the worst score being 1 and the best score is 5. If the score is 4 or 5 the video is considered as high quality, score 3 is considered as an average quality, score 1 and 2 is considered as low quality.

Global quality scale

1. Poor quality, poor flow, most information missing, not helpful for patients

2. Generally poor, some information is 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 (16).

The modified DISCERN that was designed tool by Chamock et al. was used for assessment of the reliability of the YouTube videos. The tool was designed by Chamock et al. DISCERN reliability tool is an evaluation method with 5 yes or no questions. Each yes answer is evaluated as 1 point and the total maximum score is 5 (17). Discern reliability tool showed as follows:

1. Is the video clear, concise, and understandable?

2. Are valid sources cited? (from valid studies, physiatrists, or

rheumatologists)

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?

All videos were viewed by two independent researchers (CK, YGD). The intra-rater and inter rater reliabilities of the video were assessed with the Kappa score and to examine intra-rater compliance, 30 videos were randomly selected and watched by each researcher 10 days after the first evaluation.

Statistical analysis

Statistical analysis was performed using 23.0 SPSS (IBM, Armonk, NY, USA) statistical package program. Descriptive statistics were given as numbers (%); for continuous variables, median (minimum-maximum). The suitability of the data to the normal distribution was assessed by the Shapiro-Wilk test. Kappa score was used for intra-rater and inter-rater reliabilities. The comparisons between low, medium and high-quality groups that do not comply with normal distribution were performed using Kruskal- Wallis test and groups of bilateral comparisons (low-medium, low-high, medium-high-quality) Mann- Whitney U test. The level of significance was considered $p < 0.05$.

Results

A total of 282 videos were evaluated by the researchers and there were 83 irrelevant videos, 11 repeated videos, 48 non-English videos, and five videos with poor picture and sound quality. After all, following the exclusion criteria, 135 videos remained. (Figure-1). The view duration of videos was 372 (14-7080) seconds, while the number of views was 1138 (4 - 4006668). The general features of the videos were shown in Table-1.

According to GQS, 27 (20%) of videos were low

quality, 47 (34.8%) of medium quality, and 61 (45.2%). Most YouTube video sharing was performed by Nonphysician Health Personnel. When the videos were examined by source, 18 (13.3%) were Physician, 42 (31.1%) were Nonphysician health personnel, 15 (11.1%) were Academic/university, 23 (17.0%) of were Health-related website, 14 (10.4%) of were Patient/ independent user, 21 (15.6%) of were trainer, 2 (1.5%) of were Society/non-profit organization. The source of high-quality videos was Nonphysician health personnel (%54.8), Physician (%61.1), Academic/university (%60), and Health-related website (%52.2) while the low and medium-quality videos were presented by Trainer (%14.3), Patient/independent user (%21.4), and Society/non-profit organization (%0) (Table-2).

There was a statistically significant difference in DISCERN score between quality groups and the highest score was in the high-quality group (p<0.001). There was no statistically significant difference between the quality groups in terms of duration per day, the number of views, comments, likes, and dislikes (p=0.731, p=0.879, p=0.801, p=0.874, p=0.524, respectively) (Table-3). The total duration of videos, the total number of views, comments, likes, and dislikes were classified by the video source and shown in Table-4.

When the content of the videos was examined, of a total of 135 videos, 110 (81.5%) had information about COVID-19, and 104 (77%) emphasized the importance of pulmonary rehabilitation in COVID-19. The most mentioned content was diaphragmatic breathing in 88 (65.2%) and thoracic expansion exercise in 79 (58.5%). The distribution of videos by content was shown in Table-5. The Kappa score used to examine the accordance intra-rater was 0.825, while the inter-rater kappa score was 0.842 and 0.896.

Table 1. General features of the videos

Video features	Total videos (n=135)
Duration (seconds)	372 (14-7080)
View number	1138 (4 - 4006668)
Number of comments	2 (0 - 3989)
Total likes	35 (0 - 74000)
Total dislikes	1 (0 - 1400)

median (minumum-maximum)

Table 2. Categorization of the videos according to sources

	Low quality	Moderate quality	High quality	Total
Physician	1 (5.6)	6 (33.3)	11 (61.1)	18
Nonphysician health personnel	7 (16.7)	12 (28.6)	23 (54.8)	42
Academic/university	1 (6.7)	5 (33.3)	9 (60.0)	15
Health-related website	3 (13.0)	8 (34.8)	12 (52.2)	23
Patient/independent user	8 (57.1)	3 (21.4)	3 (21.4)	14
Trainer	6 (28.6)	12 (57.1)	3 (14.3)	21
Society/non-profit organization	1 (50.0)	1 (50.0)	0 (0)	2

Table 3. Comparison of the video parameters between the low-quality, intermediate and high-quality groups

Video quality	DISCERN score	Durations per day	Views per day	Comments per day	Like per day	Dislike per day
Low (n=27)	2 (0–4)[a]	1.10 (0.08-31.33)	5.94 (0.53–718.34)	0.02 (0–0.57)	0.19 (0–10.67)	0 (0–0.42)
Moderate (n=47)	3 (1–5)[b]	1.06 (0.14-17.36)	5.81 (0.1–3737.76)	0.01 (0–2.87)	0.17 (0–49.74)	0 (0-1)
High (n=61)	4 (2-5)[c]	1.36 (0.14-46.20)	5.31 (0.04–10488.66)	0.01 (0–10.44)	0.12 (0–193.72)	0 (0–3.66)
P value	**<0.001**	0.731	0.879	0.801	0.874	0.524

a, b, c: different letters indicate statistically significant difference (p<0.001 for al p's). median (minumum-maximum)

Table 4. Parameters of the videos according to the sources

Source	Duration (seconds)	Number of views	Number of comments	Number of likes	Number of dislikes
Physician	236 (30 - 3438)	867 (4 – 4.006,668)	2.5 (0 - 3989)	28.5 (0 - 74000)	0 (0 - 1400)
Nonphysician health personnel	437 (91.2 - 3018)	4397 (58 – 1.018,382)	3.5 (0 - 647)	60.5 (0 - 14000)	1 (0 - 562)
Academic/ university	1343 (81 - 7080)	120 (18 – 211.649)	0 (0 - 5)	6 (0 - 19)	0 (0 - 1)
Health-related website	266 (49 - 4380)	900 (33 – 896.913)	2 (0 - 1609)	30 (0 - 16000)	0 (0 - 422)
Patient/ independent user	323 (14 - 1929)	745 (553 – 159.155)	5 (0 - 162)	29.5 (9 - 1000)	1 (0 - 129)
Trainer	327 (83.4 - 1770)	6229 (442 – 354.655)	7 (0 - 337)	90 (13 - 6300)	3 (0 - 167)
Society/ non-profit organization	105.9 (82.2 - 129.6)	2248 (850- 3646)	2.5 (0-5)	17 (16- 18)	0.5 (0-1)

median (minumum-maximum)

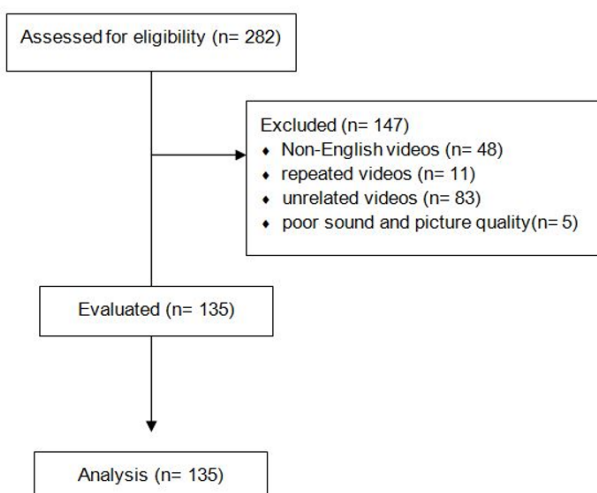**Table 5.** Distribution of the video contents

Video contents*	Total, n (%)
Information about COVID-19	110 (81.5)
The importance of pulmonary rehabilitation in COVID-19	104 (77.0)
The psychological effect of COVID-19	36 (26.7)
Bronchial hygiene techniques	30 (22.2)
Diaphragmatic breathing techniques	88 (65.2)
Pursed-lip breathing technique	66 (48.9)
Thoracic expansion exercises	79 (58.5)
Other controlled breathing techniques	74 (54.8)
Respiratory muscles strengthening exercises	36 (26.7)
Upper extremity strengthening exercises	39 (28.9)
Aerobic exercises	26 (19.3)

n number, % percentage. *More than one topic can be mentioned in a video

Flow Diagram

Assessed for eligibility (n= 282)

Excluded (n= 147)
- Non-English videos (n= 48)
- repeated videos (n= 11)
- unrelated videos (n= 83)
- poor sound and picture quality(n= 5)

Evaluated (n= 135)

Analysis (n= 135)

Discussion

In this study, the quality, source, and content of YouTube videos related to pulmonary rehabilitation in COVID-19were evaluated. The most important result of this study was to have high-quality video content of 61 (45.2%) and the most video sharing was made by Nonphysician Health Personnel. The main sources of high-quality videos were Nonphysician Health Personnel and followed by the Health-related website and Physician. When the video content was examined, it was determined that 81.5% had the information about COVID-19, 77% had the importance of pulmonary rehabilitation in COVID-19 and the most mentioned contents were diaphragmatic breathing and thoracic expansion exercises.

In infected people with COVID-19, pulmonary rehabilitation should begin and continue with physician control to improve quality of life and to improve the respiratory and physical capacity (18). To minimize contamination during pulmonary rehabilitation, protective equipment such as social distance, masks have to be used (8, 19). This reduces training efficiency, makes it difficult to demonstrate the exercises, and may cause misrepresentation of information (20). Therefore, the preferred frequency of the methods provided through telerehabilitation programs and online platforms is increasing (19, 21). There is only one study in the literature that examines YouTube video resources on pulmonary rehabilitation in COVID-19. In this study, video resources related to pulmonary rehabilitation in COVID-19 were examined, and 22 (34.9%) videos were reported as high quality, 19 (30.2%) videos of medium quality, and 22 (34.9%) as low quality (18). In our study, when all videos are assessed in terms of quality, 61 (45.2%) were high-quality, 47 (34.8%) of medium quality, and 27 low quality (20%). What distinguishes our study from the study conducted by Koçyigit et al. (22) is that the number

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of videos watched is higher and almost all videos on YouTube related to the subject have been watched. In addition, unlike the mentioned study, in our study, for the first time in the literature, video contents such as information about COVID-19, the importance of pulmonary rehabilitation, its psychological effect, and exercise methods were examined and recorded in detail. In this context, we think that we have made a more comprehensive contribution to the literature.

In a study in which YouTube videos shared on rheumatic diseases in Covid-19 were evaluated, the source of high-quality videos was by academic /university and physicians, while low-quality videos were shared by the patient / independent user and news agencies (15). In a study evaluating video sources related to the use of the drug Secukinumab, the main source of low-quality videos was by patient/independent user (23). Following the literatüre, in our study, the main sources of high-quality videos are provided by Nonphysician health personnel, Health-related website, Physician ve academic/university, while low-quality videos were provided by patient/independent users. Our study once again reveals the importance of the source of the video to avoid complications, concerns, and uncertainties that may arise with false and misleading information. Even though there were more high-quality videos about pulmonary rehabilitation in COVID-19 on YouTube, there were too many low-quality videos that could not be ignored. For this reason, while the physician and non-physician health personnel are recommending the videos about pulmonary rehabilitation to COVID-19 patients on YouTube, they should emphasize that the importance of preference of health-related experts' sources. On the other hand, the viewer should be careful about the quality of the videos shared by the independent user/patient.

YouTube is the online platform in which users can express their thoughts as 'like' or 'dislike' and one can easily share their comments and communicate with each other (24). All videos have been recorded according to their duration, the number of views, likes, dislikes, and comments. There was a significant difference in the Discern score between the three groups, and the highest score was in the high-quality group. There was no statistically significant difference between the low, medium, and high-quality groups in terms of daily duration, view number, likes, dislikes, and comments. Similar to our results, Myungeun Yoo et al. (14) and MacLeod et al. (25) did not find a statistically significant difference in video parameters. These results show that when users select videos about pulmonary rehabilitation in COVID-19, they view accurate and reliable videos as well as false and misleading videos and express their opinions. Şahin et al found that useful videos had more views and likes (26). In contrast, Dubey et al found that non-beneficial videos had a higher daily view rate than beneficial videos (27). Moon et al, on the other hand, showed that misleading videos had more likes and total duration than useful videos (28). Therefore, we think that internet users should not

consider these parameters as a criterion for selecting YouTube videos and should pay less attention.

In the digitalizing world, the use of social platforms such as YouTube as a source of health information is increasing. However, there is no control mechanism regarding the accuracy and reliability of shared information (29). In the YouTube video content about pulmonary rehabilitation in COVID-19, information about COVID-19 and the importance of pulmonary rehabilitation was frequently emphasized, but the source that mentions its psychological effect was limited to 26.7%. While many videos were mentioning about controlled breathing techniques, there were fewer sources that included aerobic exercise with strengthening the respiratory muscles and auxiliary respiratory muscles. Even though the videos on the YouTube platform about COVID-19and pulmonary rehabilitation had rich content, only 6 (4.4%) contained all 11 topics. Therefore, it should be emphasized by physicians and other health professionals to viewers that it will be useful to watch multiple videos to learn more about the topic.

The study has some limitations. All videos were evaluated cross-sectionally in a single time frame. Since the videos are evaluated in a different time frame, the number of views, likes, dislikes, and comments of the videos may change, as well as new videos can be added and some videos can be deleted. Secondly, videos that are only in English were included in the study. It should be noted that the quality of video resources in other languages can affect the results of the study. Another limitation was that the intra-rater and inter-rater compliance score was high, however, it was not sufficient to be evaluated by only two physicians. Finally, although video content has been thoroughly reviewed and specific scales such as GQS have been used, video quality assessments were subjective. Strength of our study is the sepeately evaluation of the parameters used in pulmonary rehabilitation in the videos.

Conclusion

In the video preference related to pulmonary rehabilitation in COVID-19, videos created by health professionals should be preferred on YouTube and users should be advised to pay attention to this point. The duration of video, number of views, likes, dislikes, and comments should not be used in the video preferences. Especially experienced professionals in pulmonary rehabilitation medicine should create more videos for internet users to reach high quality, accurate, reliable, awareness-raising YouTube videos rich in video content.

References

1.Grigoletto I, Cavalheri V, de Lima FF, Ramos EMC. Recovery after COVID-19: The potential role of pulmonary rehabilitation. Brazilian journal of physical therapy. 2020.

2.To KK-W, Sridhar S, Chiu KH-Y, Hung DL-L, Li X, Hung IF-N, et al. Lessons learned 1 year after SARS-CoV-2 emergence leading to COVID-19

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pandemic. Emerging microbes & infections. 2021;10(1):507-35.

3.Ataç Ö, Özalp YC, Kurnaz R, Güler OM, İnamlık M, Hayran O. Youtube as an Information Source During the Coronavirus Disease (COVID-19) Pandemic: Evaluation of the Turkish and English Content. Cureus. 2020;12(10):e10795.

4.Wu X, Liu X, Zhou Y, Yu H, Li R, Zhan Q, et al. 3-month, 6-month, 9-month, and 12-month respiratory outcomes in patients following COVID-19-related hospitalisation: a prospective study. The Lancet Respiratory medicine. 2021;S2213-600(21)00174-0.

5.Cao J, Zheng X, Wei W, Chu X, Chen X, Wang Y, et al. Three-month outcomes of recovered COVID-19 patients: prospective observational study. Ther Adv Respir Dis. 2021;15:17534666211009410.

6.Yang LL, Yang T. Pulmonary rehabilitation for patients with coronavirus disease 2019 (COVID-19). Chronic Dis Transl Med. 2020;6(2):79-86.

7.Aytür YK, Köseoğlu BF, Taşkıran ÖÖ, Ordu-Gökkaya NK, Delialioğlu SÜ, Tur BS, et al. Pulmonary rehabilitation principles in SARS-COV-2 infection (COVID-19): A guideline for the acute and subacute rehabilitation. Turkish journal of physical medicine and rehabilitation. 2020;66(2):104.

8.Wang TJ, Chau B, Lui M, Lam GT, Lin N, Humbert S. Physical Medicine and Rehabilitation and Pulmonary Rehabilitation for COVID-19. Am J Phys Med Rehabil. 2020;99(9):769-74.

9.Sun J, Liu J, Li H, Shang C, Li T, Ji W, et al. Pulmonary rehabilitation focusing on the regulation of respiratory movement can improve prognosis of severe patients with COVID-19. Ann Palliat Med. 2021;10(4):4262-72.

10.Li HO-Y, Bailey A, Huynh D, Chan J. YouTube as a source of information on COVID-19: a pandemic of misinformation? BMJ global health. 2020;5(5):e002604.

11.Berke A, Ömer K. A reliable source of information on botulinum toxin injection used in the treatment of spasticity: YouTube. Journal of Health Sciences and Medicine.4(6):927-30.

12.Kim J, Kim R, Jun JS, Ahn SH, Jung S, Minn YK, et al. Content Analysis of Korean Videos Regarding Restless Legs Syndrome on YouTube. J Mov Disord. 2021.

13.Kocyigit BF, Nacitarhan V, Koca TT, Berk E. YouTube as a source of patient information on ankylosing spondylitis exercises. Clin Rheumatol. 2019;38(6):1747-51.

14.Yoo M, Hong J, Jang CW. Suitability of YouTube Videos for Learning Knee Stability Tests: A Cross-sectional Review. Arch Phys Med Rehabil. 2020;101(12):2087-92.

15.Kocyigit BF, Akaltun MS, Sahin AR. YouTube as a source of information on COVID-19 and rheumatic disease link. Clin Rheumatol. 2020;39(7):2049-54.

16.Akyol A, Karahan İ. Is YouTube a quality source of information on sarcopenia? Eur Geriatr Med. 2020;11(4):693-7.

17.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(2):105-11.

18.Zampogna E, Paneroni M, Belli S, Aliani M, Gandolfo A, Visca D, et al. Pulmonary Rehabilitation in Patients Recovering from COVID-19. Respiration. 2021;100(5):416-22.

19.Gautam AP, Arena R, Dixit S, Borghi-Silva A. Pulmonary rehabilitation in COVID-19 pandemic era: The need for a revised approach. Respirology (Carlton, Vic). 2020.

20.Pedersini P, Corbellini C, Villafañe JH. Italian physical therapists' response to the novel COVID-19 emergency. Physical therapy. 2020;100(7):1049-51.

21.Onder ME, Zengin O. YouTube as a source of information on gout: a quality analysis. Rheumatol Int. 2021:1-8.

22.Koçyiğit BF, Akyol A, Şahin AR. ANALYSIS OF YOUTUBE VIDEOS ON PULMONARY REHABILITATION IN COVID-19. Central Asian Journal of Medical Hypotheses and Ethics. 2021;2(1).

23.Kocyigit BF, Akaltun MS. Does YouTube provide high quality information? Assessment of secukinumab videos. Rheumatol Int. 2019;39(7):1263-8.

24.Ahuja K, Aggarwal P, Sareen JR, Mohindru S, Kandwal P. Comprehensiveness and Reliability of YouTube as an Information Portal for Lumbar Spinal Fusion: A Systematic Review of Video Content. Int J Spine Surg. 2021;15(1):179-85.

25.MacLeod MG, Hoppe DJ, Simunovic N, Bhandari M, Philippon MJ, Ayeni OR. YouTube as an information source for femoroacetabular impingement: a systematic review of video content. Arthroscopy. 2015;31(1):136-42.

26.Şahin A, Şahin M, Türkcü FM. YouTube as a source of information in retinopathy of prematurity. Ir J Med Sci. 2019;188(2):613-7.

27.Dubey D, Amritphale A, Sawhney A, Dubey D, Srivastav N. Analysis of YouTube as a source of information for West Nile Virus infection. Clin Med Res. 2014;12(3-4):129-32.

28.Moon H, Lee GH. Evaluation of Korean-Language COVID-19–Related Medical Information on YouTube: Cross-Sectional Infodemiology Study. Journal of medical Internet research. 2020;22(8):e20775.

29.Andika R, Kao CT, Williams C, Lee YJ, Al-Battah H, Alweis R. YouTube as a source of information on the COVID-19 pandemic. Journal of Community Hospital Internal Medicine Perspectives. 2021;11(1):39-41.