

YouTube Videos as an Information Source About Aerobic Exercise in Rehabilitation of Lung Cancer

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Abstract

Objective: The internet has become a preferred source for obtaining information about diagnostic and treatment methods related to health issues. This study aims to investigate whether aerobic exercise videos on the YouTube platform are an excellent source for lung cancer patients.

Methods: The keywords, “lung cancer and exercise,” “lung cancer and physical activity,” and “lung cancer and rehabilitation” were used to identify videos on YouTube on 27 to 28 May 2023. We recorded the characteristics of the videos, including the number of views, duration, days since upload, and the number of likes and dislikes. The Global Quality Scale and the modified DISCERN questionnaire were used to assess the quality and reliability of videos.

Results: 150 videos were evaluated. 12 of 150 videos met the eligibility criteria. Lung cancer and aerobic exercise in rehabilitation videos were most commonly uploaded by health organizations and patients. Videos had a median of 3300 views. We assessed videos for user-focused video quality using the DISCERN instrument and found that the average total score was 3 (range 2-5). Inter-observer agreement was 0.89 and 0.91 for DISCERN and GQS scored, respectively.

Significance of Results: The results show that YouTube can be a preferred, easy, and inexpensive way to access aerobic exercise modalities, which are the basic rehabilitation steps for lung cancer patients. Experts recommend increasing the number of high-quality videos explaining the exercises. To fill this gap, healthcare professionals and organizations can take an active role in planning, producing, or ensuring reliable content. Collaborations with medical institutions and physiotherapists could further ensure that patients have access to accurate and effective exercise guidance, ultimately improving rehabilitation outcomes.

Keywords

lung cancer, exercise, rehabilitation, physical activity, YouTube

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Introduction

Lung cancer, the most common type of cancer, is the leading cause of cancer mortality.¹ The survival rate of lung cancer has shown little improvement in recent years. In this process, improving the quality of life of individuals with lung cancer and ensuring maximum independence are very important.^{2,3} Many cancer types, including lung cancer, often prefer physical activity and exercise as treatment modalities to reduce symptom burden and increase functional capacity.⁴

Many guidelines will benefit healthcare professionals for lung cancer diagnosis, treatment, symptoms, exercise,

and physical activity recommendations.⁵⁻⁷ Patients with lung cancer have limited access to rehabilitation services because of physical symptoms, social support, and financial problems. Access to reliable online resources will be the easiest health guide for these patients. However,

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publications analyzing the content of online resources are limited or very general in the literature.⁸

Nowadays, the rate of online searches regarding health issues has significantly increased. The Internet is becoming a popular source of health information about lung cancer and optimal exercise and physical activity methods for healthcare professionals, patients, and their caregivers.⁹ YouTube (<https://www.youtube.com/>) is the second most popular website. Cancer patients also often prefer to use this easily accessible platform.^{10,11} Patients usually perceive online health videos as originating from experts or medical professionals. However, studies evaluating the content quality and content providers of videos published on the YouTube platform for chronic diseases are limited and the existing findings contain general statements. This situation raises questions regarding the extent to which YouTube videos provide accurate and unbiased information about diseases, as well as their effectiveness from the patients' perspective.¹²

In 2020, the number of YouTube users exceeded 2.1 billion. Research conducted by Ceci et al.¹³ indicates that over 95% of internet users engage with YouTube regularly. Additionally, the 2018 Health Information National Trends Survey reported that more than one-third of patients seek health-related content through YouTube videos.¹⁴ However, YouTube videos have been shown to offer low educational quality for understanding disease progression and proper disease management. Regarding patient education and behavior, YouTube healthcare videos have been found to contain misleading information across a wide range of pathologies.^{15,16} Given these findings, it is imperative to acknowledge the critical importance of initiatives designed to reduce exposure to health-related misinformation on social media platforms. These concerns, and doubts about the quality of health content available on digital platforms, persist. There is a significant gap in the literature regarding the accuracy and reliability of educational video content in health communication, particularly about cancer prevention and management.¹⁷

On YouTube, there are various videos related to the treatment and exercise approaches for orthopedic, rheumatologic, and neurological conditions; however, studies including cancer and exercise models are limited. What is missing from existing research is that YouTube videos about exercise and physical activity in people with cancer have not been analyzed in detail for accuracy, characteristics, and reliability. Additionally, studies that include evaluations from the perspective of the video content uploaders have not yet been published. Access to accurate chronic disease information and the contribution of health professionals in this area is uncertain.¹⁸⁻²⁰ Studies investigating cancer rehabilitation videos available on the YouTube platform have observed a lack of optimal exercise framework and a lack of addressing parameters such as duration, intensity, repetition count, and frequency. The YouTube platform contains videos covering the risk factors, treatment, and

rehabilitation processes of breast cancer.²⁰ While there are studies in the literature examining YouTube videos related to the risk factors and treatment process of lung cancer, researchers have not yet explored data concerning the rehabilitation process. An important deficiency in the literature is the use of scoring systems based only on certain scales to evaluate video content. However, a detailed analysis of the content at the level of sub-headings can contribute to a more comprehensive identification of deficiencies in videos. This study aims to fill the gap in lung cancer research by providing not only a classification of video quality but also an in-depth evaluation of the content in terms of scope. The main aim of this study was to evaluate the scientific adequacy and clinical applicability of aerobic exercise videos for lung cancer rehabilitation on the YouTube platform. In this context, the study includes the following specific objectives:

- 1) To examine the informative value, scientific validity, and reliability of aerobic exercise videos for lung cancer rehabilitation on YouTube.
- 2) To determine the basic components of optimal aerobic exercise training videos by analyzing the content quality of videos within the framework of evaluation criteria.
- 3) To evaluate the compatibility and adequacy of the exercise parameters (such as duration, intensity, number of repetitions, and frequency) presented in the videos with clinical guidelines and to demonstrate the suitability of these contents for clinical use.

Methods

This study was designed as a descriptive analysis to evaluate YouTube content related to lung cancer and aerobic exercise. Given the dynamic nature of YouTube, where new videos are continuously uploaded, a standardized and time-sensitive approach was adopted. To ensure methodological consistency and minimize discrepancies in video availability, all videos were screened using predefined keywords, and those meeting the inclusion criteria were identified. YouTube was searched with the keywords "lung cancer and exercise," "lung cancer and physical activity," and "lung cancer and rehabilitation" for this research on 27 to 28 May 2023. The researchers searched in English, writing each keyword separately to identify all related videos. Since the information analyzed in this study was publicly accessible on YouTube, ethical approval was not obtained.

The video uploaders were divided into 5 categories: (1) physicians, (2) healthcare organizations, (3) medical companies, (4) patients, and (5) independent users.²¹

Selection of Keywords

There are no standardized guidelines for keyword selection in studies analyzing YouTube content, and researchers often

determine keywords based on their criteria. To increase the generalizability of our findings and minimize selection bias, we conducted a systematic review of multiple databases to identify commonly used keywords related to lung cancer and exercise. All searches during the selection of keywords were carried out by 3 physiotherapists who were experienced in their field and had a doctorate in physiotherapy and rehabilitation. The researchers performed the keyword selection process on separate computers to ensure objectivity. The final set of keywords was determined through a consensus-based approach, integrating expert recommendations to improve methodological rigor and reproducibility.

Video Selection

The previous browsing history and cookies were cleared before the search. A total of 150 top videos were aimed to be examined and saved in a separate playlist. The literature reports that targeting 50 top videos for each keyword is a feasible method of video selection. Previous research has shown that individuals tend to watch the first videos listed on any media server.^{22,23} The number of views on the YouTube videos was used to search for them. Consequently, they prioritized the videos with the highest views. The researchers recorded the video links. A fundamental aspect of YouTube studies is the efficient screening of videos that align with well-selected keywords within a limited time-frame. The researchers completed the study within 2 days. During the viewing of the videos, the researchers scored them independently in different environments.

The exclusion criteria of the study were determined as only the narrator speaking in the video, not being in English, poor image and sound quality, repetitive and intermittent videos, irrelevant content, being shorter than 30 seconds and longer than 30 minutes in length since viewer engagement significantly reduces in longer videos. The search method and exclusion criteria applied were similar to previous studies on the subject. Finally, we analyzed 12 videos in this study.

Evaluation of the Videos

The reliability and quality of the videos were independently evaluated by 2 PhD physiotherapists (i.e., the first 2 authors, DK and ADK). Discrepancies between their assigned scores were identified, and in instances of disagreement, consensus discussions were held to resolve these differences. To ensure both inter-rater and intra-rater reliability of the adapted scoring system, the reviewers re-assessed 12 videos 2 weeks after the initial evaluation. In addition, these videos were independently evaluated by a third researcher (SAU), who was blinded to the scores assigned by the other evaluators, and a final consensus decision was subsequently

reached. Inter-rater reliability was calculated for DISCERN and Global Quality Scale (GQS) scores as described as below.^{24,25}

Review

The characteristics of videos (number of views, duration, days since upload, number of likes and dislikes, comments) were recorded. The number of likes, dislikes, and comments related to the interaction level of the videos was determined. The engagement rate was calculated with the following formula: number of views/day. We calculated the like ratio using the following formula: $(\text{likes} \times 100) / (\text{likes} + \text{dislikes})$.

Video Quality

The quality of the videos was evaluated by GQS. Bernard et al created the scale. The scoring system of this scale is based on the usefulness, flow, and quality of the video for the target individual who will potentially watch the video.²⁶ This scale was designed to evaluate the content quality of online resources. It is a Likert-type scale. It evaluates between a minimum of 1 and a maximum of 5 points. A score of 4 or 5 shows that the video has high quality, a score of 3 indicates that it has medium quality, and a score of 1 or 2 shows that it has low quality.²⁴

Reliability of Videos

The reliability of the videos was evaluated with modified DISCERN. The scale is created to examine the quality of written health information. Each question of this instrument, which consists of 5 items, is answered “yes” or “no.” Each yes answer receives 1 point, and the maximum score is 5. Higher scores indicate greater reliability.²⁵

Statistical Analysis

The normality of data was analyzed with the Shapiro–Wilk test. The data of video duration, upload time, views, likes, dislikes, comments, and like rate were expressed as median (min-max). In calculations of correlations, video quality was considered as the independent variable and categorized using on the Global Quality Score (GQS). The dependent variable was the presence of physical activity content in the videos, which was classified into different categories (walking, cycling, swimming, calisthenics exercises, and warm-up/cool-down exercises). Correlations of video quality and exercise/physical activity were performed using the Spearman Test. The distribution of video quality according to the uploader was presented numerically, whereas the distributions of DISCERN and GQS scores were visualized using color coding. The Cohen’s kappa coefficient was used

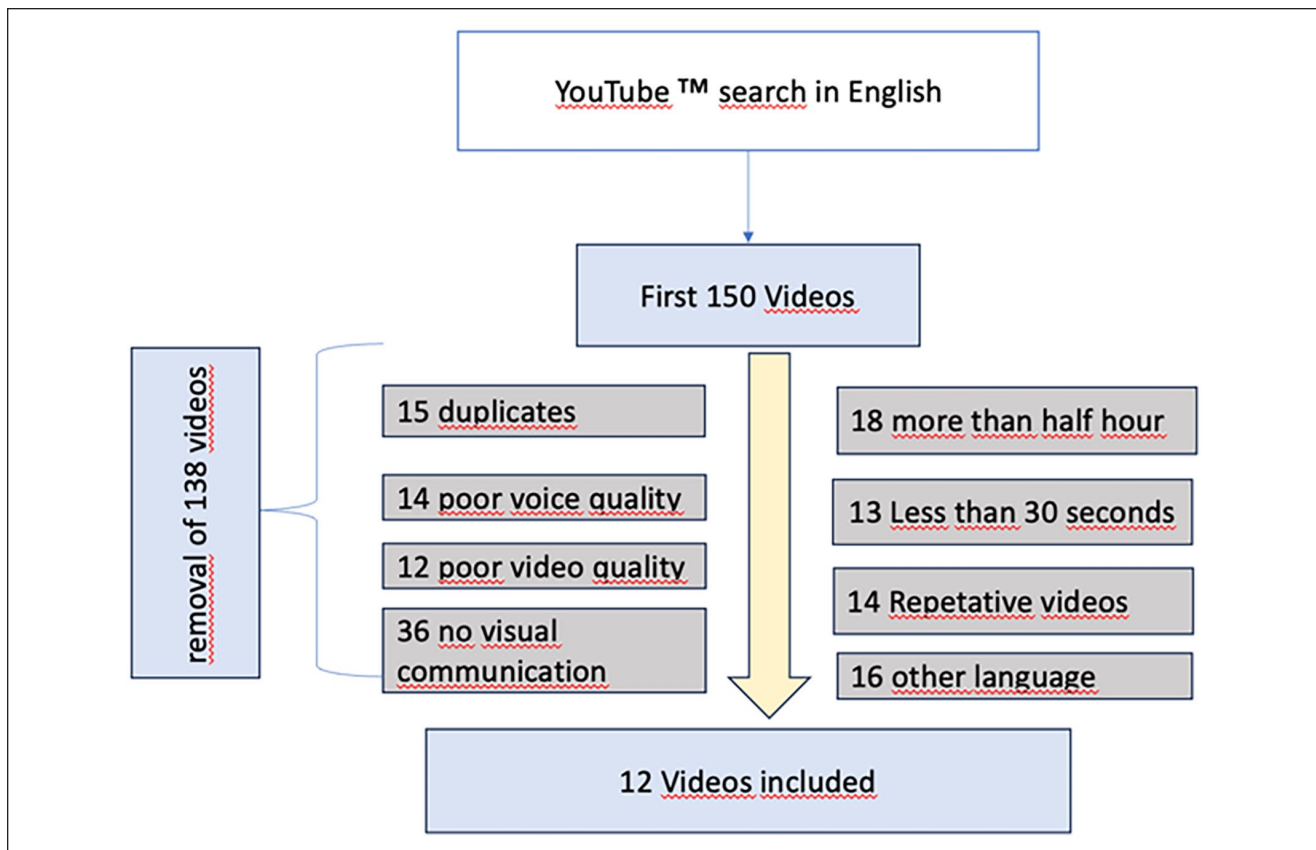


Figure 1. Flow diagram of You Tube Video selection.

to evaluate the inter-rater agreement. The Statistical Package for Social Science version 22.0 (IBM Corp. Armonk, NY, USA) was used for analysis. A 95% confidence level and a significance level of $P < .05$ were used to analyze the results.

Results

In a YouTube search on 27 to 28 May 2023, a total of 150 videos were reviewed in the current study. A strong inter-rater agreement was observed between the 2 evaluators in classifying the videos based on their reliability (Kappa coefficient: 0.903). 138 videos were excluded from the study because they did not meet the inclusion criteria. The remaining 12 videos were assessed in this study. Figure 1 shows the flow chart of the video selection process.

Video Characteristics

In our study conducted on the YouTube platform, it was determined that videos featuring aerobic exercise for lung cancer and adhering to inclusion criteria were uploaded between 2001 and 2022. Videos have a median of 3300

views. There were no dislikes in the videos. Videos discussing aerobic exercise in lung cancer received a maximum of 236 comments. The video duration, knowledge of upload, amounts of views, likes, dislikes, comments, and like ratio are given in Table 1.

There are 5 categories of video uploaders in this study. Videos related to lung cancer and aerobic exercise in rehabilitation were most commonly uploaded by health organizations and patients. Medical companies uploaded the lowest number of videos. It was found that physicians uploaded the highest quality videos. The video quality details of GQS and knowledge of video uploaders are given in Table 2.

Video Quality Evaluation With DISCERN Scores and Global Quality Score (GQS)

The evaluators used the DISCERN and GQS instruments to assess the user-focused quality of the videos. Question-based clustering of the questionnaires and color coding examining video quality is demonstrated in Table 3. According to DISCERN, the most basic problem in videos is that they lack references to authoritative material and sufficient resources are not provided to patients. The

Table 1. Video Characteristics.

Video characteristics	Median	Min-Max
Video duration (min)	6.58	2.01-12.47
Months since upload	48	12-264
Views	3300	12-200.000
Likes	3,5	0-19.000
Dislikes	0	0
Comments	0	236
Like rate	100	0-100
Global Quality Scale (GQS)	3	2-4
DISCERN total	3	2-5

Table 2. Video Quality Assessment According to the Global Quality Scale by Source Group.

Sources	Poor quality (n)	Moderate quality (n)	High quality (n)	Total (n= 12)
Physician	-	-	3	3
Healthcare organization	1	1	2	4
Medical company	1	-	-	1
Patient	2	1	1	4
Independent user	-	-	-	-

responses clustering demonstrated that many videos achieved high scores according to GQS.

Aerobic Exercise

Upon examination of video content related to aerobic exercise, and physical activity in lung cancer patients, it was observed that all 12 videos reviewed included references to walking. Activities such as cycling, swimming, and calisthenics were recommended as additional parameters for rehabilitation in lung cancer. The distribution of exercise types depicted in Figure 2 illustrates these findings. However, no definitive statements were found regarding the duration, intensity, or frequency of exercise in the videos related to lung cancer and exercise. The study found that as video quality improved, the relationship between video content and aerobic exercise became stronger. Table 4 presents the correlation between video quality and different types of physical activity content. The number of videos related to each type of physical activity (n) and the correlation coefficient (r) are shown in the table to display the relationship between video quality and the presence of specific physical activity content. A positive correlation coefficient indicates that higher-quality videos are more likely to include the respective Physical activity/exercise type. However, in categories where the number of videos (n) was 1 or 0, meaningful correlation calculations were not

possible, and the interpretation of these results is therefore limited.

Discussion

This study represents the first comprehensive examination of the content and quality of YouTube videos as a source of information on aerobic exercise for lung cancer patients. The results of this study indicate that there is limited information available on YouTube related to exercise for lung cancer. The research revealed that although many resources are available regarding lung cancer patients, the videos do not meet the criteria for content, duration, language, speaker, and visual and auditory communication. This study found that videos that included aerobic exercises tended to be of higher quality. Videos uploaded by health professionals were found to be of higher quality but also had some shortcomings. Walking is widely recommended as a primary form of aerobic exercise; however, detailed information on its intensity and duration, along with high-quality instructional videos, is often lacking. According to DISCERN, the most basic problem in videos is that they lack references to authoritative material and sufficient resources do not provide sufficient resources for patients. By highlighting these shortcomings, our study provides important insights into the current quality of content in this area. As a result of the study, it is posited that an increase in the number of high-quality videos offering detailed explanations of the exercises will provide valuable guidance to both patients and healthcare professionals in the management of lung cancer. In addition, healthcare professionals and organizations can take an active role in planning, producing, or ensuring reliable content. Collaborating with physicians and physiotherapists in the creation of video content can facilitate patient access to scientifically based, accurate, and effective exercise guidance.

In the digitalized world, individuals increasingly use online resources to make health-related decisions. According to the published research, 15 videos of clinical procedures uploaded to a proprietary video platform garnered only 200 views over 6 months. However, the same videos, when posted on YouTube, garnered 1.7 million views in 33 months.²⁷ YouTube is a free and easily accessible platform for patients that is used to disseminate openly accessible health-related information.²⁸ However, the absence of a peer-review process on such online platforms raises significant concerns regarding the accuracy and reliability of the information presented.¹⁴ This lack of oversight can lead to the dissemination of misleading or incomplete information, which may have detrimental effects on patient care, particularly in the context of serious diseases such as lung cancer.^{12,29} During our study, we encountered significant methodological challenges in analyzing video content on YouTube. The evaluators had

Table 3. Question-Based Clustering of the Questionnaires According to Video Quality.

Is the video clear, concise, and understandable?	Are valid sources cited? (from valid studies, physiatrists, or rheumatologists)	Is the information provided balanced and unbiased?	Are additional sources of information listed for patient reference?	Does the video address areas of controversy/uncertainty?	GQS	
Discern: Yes	No	Yes	No	Yes	High quality	
					Middle quality	
	Yes	No	Yes	No	Yes	High quality
						Middle quality
	Yes	Yes	No	Yes	No	High quality
						Middle quality
Yes	Yes	Yes	No	Yes	High quality	
					Middle quality	
Yes	Yes	Yes	Yes	No	High quality	
					Middle quality	
Discern: No	No	Yes	No	Yes	High quality	
					Middle quality	
Discern: No	Yes	No	Yes	No	High quality	
					Middle quality	

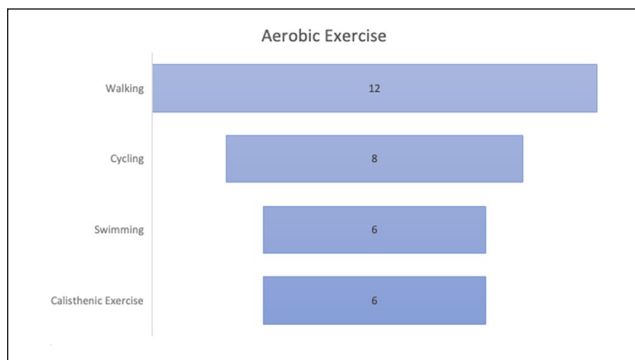


Figure 2. Types of exercise in videos.

to review the videos more than once to reach an objective conclusion in line with the criteria questioning video quality. The scoring results reflect the joint assessment of 3 experienced physiotherapists and the validated DISCERN and GQS scales were used. However, these scales do not include specific questions for the multidimensional evaluation of aerobic exercise, which was a limitation of the current scoring process. The results of our study suggest that the creation of high quality content to guide lung cancer patients to optimal exercise is a critical clinical need. In addition, there is a need to develop more comprehensive and specific measurement tools to evaluate the effectiveness of such content.

Research indicates that approximately 90% of internet users visit only the first 3 pages of search results. The literature suggests that selecting the first 50 videos based on keywords is an appropriate method for video selection.³⁰ Previous researches have shown that individuals tend to watch the first videos listed on any media server.^{22,23} In our study, the first 50 videos associated with the keywords “lung cancer and exercise,” “lung cancer and physical activity,” and “lung cancer and rehabilitation” were screened on the YouTube platform. Studies examining YouTube content do not include guidelines for the determination of keywords. In our study, sources related to lung cancer and exercise were examined in detail for the determination of keywords. To minimize bias in the research, the most frequently used keywords obtained from the literature review conducted by 3 researchers were preferred during the YouTube content search. Twelve videos meeting the inclusion criteria were examined in terms of video quality, characteristics, and content. The limited number of videos examined in our study is noteworthy. The study was conducted according to inclusion criteria that align with the literature. Considering that YouTube is a frequently used platform by individuals, the provision of high-quality videos by content uploaders, according to DISCERN and GQS scoring, could serve as a valuable guide for patients in the management of chronic diseases such as lung cancer. Furthermore, our study has demonstrated the significance of the quality of content created by video uploaders.

Table 4. Correlation of Video Quality and Exercise/Physical Activity.

Exercise types	Poor quality			Moderate quality			High quality		
	n	r	P	n	r	P	n	r	P
Walking	4	.672	<.001*	2	.826	<.001*	6	.800	<.001*
Cycling	1		N/A	2	.469	<.05*	6	.641	<.001*
Swimming	0	N/A		1		N/A	5	.598	<.001*
Calisthenic exercise	0	N/A		1		N/A	5	.655	<.001*
Warm up and cooling down exercise	1	N/A		2	.700	<.001*	6	.835	<.001*

*Spearman test, n: number of videos on the relevant topic.

YouTube is a popular resource for health professionals and patients to learn about various medical issues. However, these studies have been unable to exclude videos created by questionable sources and for non-educational purposes. There is doubt about YouTube's potential as a useful medium for spreading knowledge and increasing awareness of healthcare issues. Since YouTube doesn't have a peer-review procedure, registered individuals can share videos without subjecting them to severe scrutiny.¹² Our study, consistent with the existing literature, identified a different range of video uploaders about lung cancer and aerobic exercise. Videos produced by health professionals offer the highest quality of evidence-based information. However, the limited number of clinician-produced videos that meet the inclusion criteria reveals an important gap in the field. This situation limits access to accurate and reliable health information and highlights the need to increase the dissemination and accessibility of evidence-based content. This finding emphasizes the contribution of optimal exercise guidance and regular physical activity for lung cancer patients in line with the recommendations of health professional and reveals the need for evidence-based video content in this area. The need for physiotherapists experienced in the field of exercise to transfer the guidance they provide to lung cancer patients in the clinic to digital platforms comes to the fore. It is thought that this study, which analyzed YouTube videos on lung cancer and exercise, will make a scientific contribution to the literature and provide social benefits for the improvement of public health.

For cancer survivors, searching the Internet—especially YouTube—for information is becoming more and more common.³¹ Kim et al.³² indicate that cancer patients utilize various media and channels in a step-by-step manner to obtain information about cancer. However, there is a limited number of studies that analyze videos focused on “cancer and rehabilitation” as well as “cancer and nutrition.”³³ Our study revealed an important gap in the existing literature on lung cancer and aerobic exercise and drew attention to the inadequacy of digital health content in this field. It was determined that the video content to be prepared especially for lung cancer rehabilitation should include evidence-based information to support patients to exercise

safely and effectively. These findings reveal the need for the development of accessible exercise resources in accordance with clinical guidelines.

Video Characteristics

It was determined that cancer-related YouTube video contents are generally associated with disease prevention methods, risk factors, diagnosis, and treatment methods.²¹ In the present study, which examined exercise approaches in lung cancer, researchers found that the videos provided by physical therapists and physicians had the best content in terms of video quality. To improve the quality of life of lung cancer patients and enable them to exercise safely, we should consider providing videos with quality content and supporting exercise under appropriate conditions. During the study, it was determined that the number of videos of patients, relatives of patients, and health institution companies is high, but there are deficiencies in terms of resource presentation and balanced, unbiased information transfer. In lung cancer patients, adaptation to disease, treatment, and rehabilitation processes may vary because of personal and environmental factors. Therefore, although the experiences of patients and their relatives are very valuable, exercise recommendations in videos presented by healthcare professionals supported by the literature are much safer for patients. Additionally, selecting safe exercises while supporting the physical health of lung cancer patients is of paramount importance. In this context, increasing the number of high-quality videos featuring exercises produced by healthcare professionals and providing secure resources with objective statements and visual content accessible to patients and their families, will significantly contribute to addressing the rehabilitation needs of patients.

An examination of videos related to lung cancer, and exercise revealed a noteworthy finding: these videos exhibited a 100% like rating. Researchers have observed similar findings in studies on YouTube platforms addressing chronic diseases. Given that patients coping with challenging conditions such as lung cancer may benefit from online resources and medical support, it is crucial to enhance the availability of high-quality video content.

Video Quality

YouTube videos vary in terms of content and quality. Video evaluators might interpret subjectively the contents. Previous studies were conducted to eliminate contradictory results and present objective results regarding video quality. Scoring the surveys by more than 1 evaluator and comparing the results with an impartial evaluator will increase internal consistency in this respect. In this study, 2 researchers evaluated all videos fulfilling the inclusion criteria. (DK and ADK). The scores of the 2 raters were compared and re-scored by another author (SAU). Thus, 3 physiotherapists with experience in oncological rehabilitation analyzed them in detail. From this point of view, in this study, we analyzed exercise videos for lung cancer patients and presented all videos that met the inclusion criteria in clear, understandable, and unbiased language.

Chai and Ingledew³⁴ identified the top 50 videos using the keyword “lung cancer” in their search. Of these videos, 2 different researchers evaluated 10, while a single researcher reviewed the remaining 40. The study employed the DISCERN tool for assessing video quality and content.³⁴ In our study, all videos were assessed by 2 researchers, and an impartial reviewer compared the scores at the conclusion. Additionally, the evaluation of videos included both DISCERN and the GQS. The inclusion of additional evaluation parameters provided opportunities for a more detailed discussion.

In terms of video quality, we can say that the main deficiency is the lack of references, especially during presentations. Another important point is that the video content contains less controversial/ambiguous topics.³⁵ In the present study, it was also found that the video contents were quite limited in terms of exercise intensity, duration, type, and rest principles.

According to DISCERN criteria, references characterize high-quality content to institutions or studies, a clear presentation, and objectivity without bias. Our study identified 6 videos (50%) as high quality. The factors contributing to the high quality of these videos included the comprehensive coverage of various types of exercises, visual explanations tailored for patients, detailed descriptions of exercise protocols, and the provision of accessible resources for patients if needed. Conversely, low-quality videos provided brief exercise recommendations without adequate elaboration on their specifics. We posit that increasing the availability of high-quality videos related to lung cancer and exercise is of significant importance for patient care. However, our study is limited by the subjective nature of video assessments, the variability in exercise recommendations across different sources, and the lack of standardized guidelines for evaluating digital health content, highlighting the need for more objective and validated assessment tools in future research.

Bahar Ozdemir et al³¹ in their study of cancer and rehabilitation videos, showed that higher quality videos had higher viewership. This finding highlights the potential impact of video quality on patient engagement and trust in digital health resources. Although our study did not specifically examine the relationship between video quality and viewership, the included videos had a wide range of viewership. This variation may be influenced by factors such as content accuracy, presentation style, and source credibility. Understanding how video quality affects patient perceptions and adherence to exercise recommendations is crucial for optimizing digital health interventions. Future studies incorporating multidimensional analysis of lung cancer and aerobic exercise videos could provide deeper insights into these dynamics and guide the development of more effective and clinically relevant educational content.

Aerobic Exercise

Aerobic exercise involves continuous, rhythmic activity that engages the body’s large muscle groups, and utilizes oxygen. Common aerobic exercise includes walking, swimming, jogging, and cycling. Several studies in the literature have presented evidence regarding the benefits of aerobic exercise in lung cancer.^{4,33,35} In our study, which examined lung cancer and aerobic exercise/physical activity content on the YouTube platform, it was found that high-quality videos contained more detailed information about exercise duration and type. However, the limited number of videos meeting our inclusion criteria highlights a gap in this area. This finding highlights the urgent need for the development and dissemination of clinically validated digital exercise interventions to optimize rehabilitation outcomes in lung cancer patients and bridge the gap between clinical recommendations and patient accessibility.

Our findings suggest that higher-quality videos are more likely to include a variety of physical activity/exercise content. However, the small sample size in some categories limits the generalizability of the correlation results. Future studies should include a larger dataset to validate these findings and explore additional factors that influence video quality and content richness

We believe that increasing the number of videos that reference evidence-based studies, emphasize multidisciplinary approaches, and provide detailed explanations of exercise approaches recommended by healthcare institutions could contribute to improving trends in recovery among lung cancer patients. Improving the quality of videos that feature aerobic exercises for lung cancer patients can enhance both the effectiveness and sustainability of exercise interventions during treatment. Therefore, video content should include not only visual elements but also clear descriptions and guidance to support proper exercise modalities.

Limitation

There are several limitations inherent in our study. YouTube is a dynamic platform with a constant influx of new video uploads. The selection of keywords used in YouTube content searches was determined by the researchers. To minimize potential bias, we conducted a comprehensive review of relevant databases during this process. The selection of keywords on lung cancer and exercise was guided by specific terms addressing literature deficiencies. Given the continuous increase in the volume of YouTube content, searching within a limited timeframe after finalizing the keywords was essential to ensuring the reliability of our study.

Our study used the DISCERN and GQS tools, both of which are widely recognized, though not yet validated. Having observers view and rate the videos may limit the external validity of the findings, as these ratings may not fully reflect the perspective of patients or healthcare professionals. Descriptive analyses were preferred over detailed statistical approaches due to the limited amount of video content that met our inclusion criteria. For this study, we focused on the first 50 videos that met the inclusion criteria. Although this sample size may appear small, previous studies suggest that most users do not explore beyond the first 2 pages of search results.

YouTube is a vast platform with frequent fluctuations in video content, as new videos are constantly uploaded while older ones are removed. The platform's dynamic nature may cause variations in search results, influenced by algorithms that account for factors such as search history and internet protocol (IP) addresses. Because of these variables, it was not possible to standardize or account for all such influences.

Additionally, the scope of the evaluation was limited to videos in English. Including videos with English subtitles might have expanded the sample size, though it was beyond the scope of this study. Moreover, we did not evaluate private or unlisted videos on YouTube, and we did not perform a qualitative analysis of the comments associated with the videos. Furthermore, the relationship between video quality and specific video characteristics was not assessed.

Another limitation is that the researchers did not categorize the videos based on the treatment phase (e.g., treatment, remission, and survival stages), as patients' physical capacities can vary significantly during these phases. A more specific examination of the aerobic exercise videos tailored to these stages of treatment could provide additional insights.

Conclusion

In conclusion, YouTube can be considered an accessible and cost-effective means for accessing aerobic exercise modalities, which are fundamental components of rehabilitation for lung cancer patients. To improve the informative value,

scientific validity, and reliability of aerobic exercise videos for lung cancer rehabilitation, healthcare professionals and organizations should take a proactive role in content creation. Establishing standardized frameworks for video evaluation, integrating peer-reviewed exercise protocols, and leveraging interdisciplinary collaborations can further improve the quality and applicability of online content. In addition, our findings highlight the need to identify key components of optimal aerobic exercise training videos. Healthcare professionals should focus on developing video content that includes clinically relevant parameters, such as exercise duration, intensity, frequency, and progression to support individualized rehabilitation. Finally, incorporating valid and reliable assessment tools into digital health platforms may help bridge the gap between patient-accessible content and evidence-based clinical practice.

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