

Youtube English videos as a source of information on shoulder exercise after breast cancer surgery

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Research Article

Keywords: Breast cancer, Exercise, Physical therapy, Physiotherapy, YouTube

Posted Date: August 4th, 2021

DOI: <https://doi.org/10.21203/rs.3.rs-770823/v1>

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Abstract

Purpose To examine the content, quality and reliability of YouTube videos on exercises that can be performed after breast cancer surgery. **Methods** Videos selected from YouTube using the search terms “shoulder exercise and breast cancer surgery”, “arm exercise and breast cancer surgery”, and “physiotherapy/physical therapy and breast cancer surgery” were categorized as useful or misleading by a doctor and a physiotherapist. The videos were analyzed using the five-point DISCERN scale for reliability, the five-point Global Quality Scale (GQS) for quality, and a 10-item scale for comprehensiveness. **Results** Of the 180 videos initially analyzed, 82 were included in the study, and 42 (51.2%) were classified as having misleading information and 40 (48.8%) as having useful information. The reliability, content and quality scores of the videos containing useful information were higher ($p < 0.001$). Most of the videos in the useful information group (80%) were uploaded by universities/professional organizations/physicians/physiotherapists, while the majority of those in the misleading information group (47.6%) were uploaded by websites providing independent healthcare information. The total and daily views of the videos were higher in the useful information group than in the misleading information group ($p < 0.001$ and $p = 0.004$, respectively). When the video parameters were evaluated between the two groups, no significant difference was found in the number of likes and comments and video length. **Conclusion** YouTube can be an important instrument to protect patients from musculoskeletal system complications after breast cancer surgery and improve existing complications. Universities, physicians, and physiotherapists should be encouraged to prepare more videos containing full and accurate information on this subject.

Introduction

Globally, the incidence of cancer has been increasing rapidly in recent years, and breast cancer is the most common type of cancer in women [1]. The mortality of breast cancer, whose incidence has increased with the effect of intensive early diagnosis programs used today, is decreasing with advanced and comprehensive treatment methods (surgery, radiotherapy, and systemic adjuvant therapy) [2]. The increase in life expectancy and survival rate has necessitated focusing on the short and long term complications of treatments applied. In the literature, it has been reported that patients with breast cancer frequently experience shoulder and/or arm dysfunction [3]. Disorders reported in studies include loss of strength, sensory complaints, muscle shortness, fibrosis, pain, fatigue, and lymphedema. With surgery, soft tissue integrity in the chest wall is impaired, myofascial dysfunction occurs, and the muscle strength of the operated arm decreases compared to the contralateral arm [4].

After successful breast cancer surgery, many different types of pain can be observed, including neuropathic pain, phantom breast pain, complex regional pain syndrome, and scar tissue pain, which are categorized under the general title of postmastectomy pain syndrome. In addition, the presence of myofascial dysfunction can cause painful trigger points in the muscle, which is among the long-term symptoms [5]. Moreover, chest wall adhesions, fibrosis and axillary web syndrome can lead to limitation of shoulder range of motion and muscle shortness [6]. In the postoperative period, a protective posture, such as shoulder protraction, anterior tilt of the head, and increased dorsal kyphosis may also develop [7]. This may lead to muscle shortness and imbalance, paving the way for different orthopedic disorders in future [8]. Such disorders usually start within three months after surgery and can last until late periods [9]. Furthermore, they complicate the daily life and leisure activities of individuals, negatively affect body image, predispose them to depression and decrease their level of social participation [10, 11].

There are many different physiotherapy and rehabilitation methods that reduce musculoskeletal complications and facilitate daily living activities in patients with breast cancer. These include posture training, range of motion, stretching and strengthening exercises, aerobic exercise, and lymphedema massage [12, 13]. Despite the positive effects of these methods demonstrated by studies, very few patients with musculoskeletal complications receive rehabilitation services. The reasons for this are stated as physiotherapy applications not being included in the cancer treatment algorithm, low number of physiotherapists specialized in their field, increased healthcare costs, patients having to travel long distances, and low compliance rate of patients who do not have a regular exercise history [14, 15].

Founded in 2005 and having approximately 2 billion registered users, YouTube is the most popular social media video platform worldwide [16]. YouTube has become an easily accessible source of information, and therefore has widespread use among patients and healthcare professionals. The amount of content on educational materials is increasing rapidly [17, 18]. With the growing attention on this trend across the world, many studies have been conducted on the reliability of medical information published on YouTube [17, 19–21]. Studies evaluating the quality of YouTube exercise videos for diseases have shown that the videos on exercises for ankylosing spondylitis are of high quality, those on exercises for pelvic floor muscles are of medium quality, and those on exercises for kyphosis, constipation and carpometacarpal osteoarthritis are of low quality [22–26]. However, when we examined the literature, we did not find any study evaluating the quality of exercise videos that can be performed after breast cancer on YouTube. In this study, our aim was to fill this gap in the literature by evaluating the reliability, content and quality of the most watched YouTube videos in English language concerning exercises that can be undertaken after breast cancer surgery.

Methods

Related videos were searched on the YouTube website (<http://www.youtube.com>). First, the phrases used in commonly viewed videos on the topic were reviewed to define appropriate search terms. Based on the results of this preliminary search, the terms “shoulder exercise and breast cancer surgery”, “arm exercise and breast cancer surgery”, and “physiotherapy/physical therapy and breast surgery cancer” were selected. The search was performed on February 10, 2021, and the videos were sorted by the frequency of views. The search yielded a total of 16,462 videos. When the behavioral patterns of internet users are examined, it is stated that 90% of the users visit the first three pages [27]. Therefore, only the first three pages (20 videos/page) for each search term were evaluated independently by an experienced doctor and a physiotherapist. A total of 180 videos were evaluated. Videos that were not relevant to the topic, those in a non-English language, and those without sound were excluded from the study. Duplicated and multi-part videos were counted as a single video. The search method and exclusion criteria applied were similar to previous studies on the subject and as a result, 82 videos were included in the sample [20-26]. The URLs of all the videos that were found suitable and included in the study were recorded.

Evaluation of the usefulness of the videos

A doctor and a physiotherapist, blinded to each other's evaluation, examined all the videos for usefulness and categorized them as given below. In the absence of a consensus, a final decision was made by a doctor. The group classifications were as follows:

1. Useful information (Group 1): These videos covered most or all of the steps to be followed after breast cancer surgery, including which arm-shoulder exercises should be performed how. The information presented in these videos was considered to be accurate and help patients practice the exercises themselves.
2. Misleading information (Group 2): These videos included inaccurate information about arm-shoulder exercises that should be performed after breast surgery. If the certain parts of the videos were partially useful but contained partially misleading information on exercises that can be performed after breast surgery, they were still classified as misleading (for example, appropriate time for exercises is not specified or inaccurately given, situations when exercises should be interrupted are not clarified, and it is not stated that if pain occurs, the angle of motion should not be increased in the range of motion exercises).

Classification of the video characteristics

For each video, length, total views, time since upload, and daily views were recorded. The number of likes, dislikes and comments related to the interaction level of the videos were determined. The videos were divided into five categories according to the source of upload: (1) government/news agencies; (2) universities/professional organizations/physicians/physiotherapists; (3) independent health information websites; (4) medical advertisements/for-profit companies; and (5) patients/individuals. The videos were also divided into four groups according to the presenter's characteristics: (1) physicians/physiotherapists, (2) healthcare professionals, (3) individuals/patients, and (4) off-camera commentary. The third grouping was created according to the gender of the presenter: (1) female, (2) male, or (3) both. Lastly, the videos were examined in three groups according to the target audience: (1) healthcare professionals, (2) patients, and (3) unclassified.

DISCERN is a scale created to examine the quality of written health information [28]. In our study, a modified version of this scale, five-point DISCERN, was used to measure the reliability of the videos. The five-point Global Quality Scale (GQS) was used to evaluate the quality of the videos. The scoring system of this scale is based on the usefulness of the video for the target individual that will potentially watch the video [29]. In order to evaluate the comprehensiveness of the videos, a 10-item scale was created that included important points about exercises that can be performed after breast cancer surgery. Regardless of the order, each item was scored as 0.5 points (Table 1).

Results

In this study, 180 most viewed videos on YouTube were determined using the search terms "shoulder exercise and breast cancer surgery", "arm exercise and breast cancer surgery", and "physiotherapy/physical therapy and breast cancer surgery". Of these videos, 82 were found to meet our criteria and included in the sample for further analysis. Seventy-eight videos were excluded from the study due to irrelevance ($n = 46$), narration in a non-English language ($n = 21$), containing no image ($n = 9$), and having no sound ($n = 2$). In addition, a total of 20 videos constituted parts of three videos. Lastly, 35 videos containing duplicates were included as 13 videos. The remaining 82 videos were included in the sample. Of these videos, 40 were evaluated in the useful information category and 42 in the misleading information category (Figure 1). The kappa statistic for inter-observer agreement was 0.79 (confidence interval: 0.54-1.00). The data of the related videos were classified according to the level of usefulness and the results are given in Table 2. When the useful and misleading videos were compared, a statistically significant difference ($p < 0.05$) was found in favor of the useful videos in relation to the number of views, video length, YouTube upload time, number of dislikes, reliability, comprehensiveness, and GQS score. The primary reason for some of the videos being classified as misleading was the content including inaccurate exercise information or not including any exercise.

The relationship between the source of upload and other evaluated parameters is given in Table 3. Most videos were uploaded by universities/professional organizations/physicians/physiotherapists ($n = 42$, 51.2%). Of the videos in the useful information group, 80% were uploaded by universities/professional organizations/physicians/physiotherapist, 7.5% by independent health information websites, and 5% by for-profit companies, 5% by government/news agencies, 2.5% by patients/individuals. In the misleading information group, 47.6% of the videos were uploaded by independent healthcare websites. Pairwise comparisons showed a statistically significant difference in the number of daily views, number of likes, reliability, comprehensiveness, and GQS score in favor of the videos uploaded from reliable sources ($p < 0.05$) (Table 4).

Discussion

YouTube is a video sharing platform that hosts content in 80 different languages and has local versions in more than 100 countries. As of 2021, YouTube has more than 2 billion active users and is the second most visited website in the world with more than 1 billion hours of videos watched per day [30, 31]. The use of the internet as a source of information about health problems and treatments has increased in recent years, and YouTube is a widely used effective tool to convey medical information [32]. However, YouTube is primarily a commercial platform, and videos uploaded are only examined for copyright infringement. Therefore, published [36]medical videos do not pass any evaluation in terms of reliability, quality, and scientific accuracy [33]. Although there are studies in the literature investigating the quality and reliability of YouTube videos on breast cancer, no research has been found on exercises to be performed after breast cancer [21, 34–36].

The 82 videos included in our study had a total of 5,772,313 views, indicating that YouTube is an extensively used source for breast cancer exercises. Forty of these videos were evaluated to present useful information and 42 contained misleading information, and the distribution of the total number of views for the videos in these categories was 74.3 and 25.7%, respectively. This distribution shows that about half the video content encountered by YouTube users may contain misleading information, and it may not be easy to access accurate information. However, the number of views of the videos included in the total useful information group being approximately three times that of the misleading information group suggests that viewers can distinguish between useful and misleading information and that useful content draws more attention. These data are similar to those reported by Tolu et al. in a study investigating YouTube videos on anti-tumor necrosis factor agent injections [36]. In other studies on breast cancer self-examination videos by Esen et al. and breast cancer videos by Pan et al., it was stated that the videos with misleading content were more common [21, 37]. However, it should be kept in mind that the popularity of a video on YouTube can easily change, and when a keyword is searched, the results are sorted according to popularity by the algorithm used by YouTube [38].

In this study, the number of likes, dislikes and comments of the videos had higher mean values in the useful information group, but a significant difference was found only in the number of dislikes. This difference in the number of views was also reflected in the interaction between the video and the viewers. The mean duration of the videos in the useful information and misleading information groups was 1,733 and 1,143 days, respectively, and there was a significant difference between the two groups. This shows that videos with useful content are aired longer. As expected, the videos with useful information included in our study had higher reliability, comprehensiveness, and GQS scores than misleading videos, which is consistent with the results of studies conducted with a similar methodology in the literature [21, 23, 36, 37, 39–41].

In line with previous studies, we determined that the source of videos with useful content was mostly universities/professional organizations/physicians/physiotherapists, while the source of those containing misleading information was mostly independent health information websites [21, 36, 39, 40, 42]. When we examined the distribution of the presenters, the rates of the videos presented by physicians, non-physician healthcare professionals, individuals, and off-camera narrators were encountered at similar rates in the useful and misleading information groups, and there was no significant difference between the two groups. The most common presenter in the videos examined was non-physician healthcare professionals. These results suggest that when using YouTube as an information tool on health, attention should be focused on the source of the video rather than the presenter.

We observed that the videos uploaded by government-news agencies and universities/professional organizations/physicians/physiotherapists had the most reliable and comprehensive information, and the quality scores of these videos were also higher. The videos posted by patients-individuals and independent healthcare websites had lower reliability and quality scores, similar to the results of Önder et al. for videos on gout [39]. When patients are directed to online sources, such as YouTube, they should be advised to pay attention to the source of the video to ensure that they can access accurate, comprehensive and high-quality information. Academics, professional organizations, and healthcare professionals should be encouraged to post more videos with high-quality, comprehensive and reliable content.

Our study had certain limitations. First, the videos were included in the study in order of popularity and selected within a day. However, YouTube has a dynamic process, with videos changing on a daily basis. Secondly, we chose the search keyword as “shoulder exercise and breast cancer surgery”, “arm exercise and breast cancer surgery”, and “physiotherapy/ physical therapy and breast cancer surgery” considering that they would be most preferred by internet users. However, individuals can use different keywords, and this can be considered as a limitation. Lastly, the search language was only English.

Conclusion

Our study reveal that approximately half of YouTube videos on exercises that can be performed after breast cancer surgery provide useful information, and patients prefer videos that contain useful information. This information can help protect patients from musculoskeletal system complications after breast cancer surgery and can support the information provided by the physician/physiotherapist. On the other hand, in order to better guide their patients, healthcare professionals should be aware that the control mechanism of YouTube videos is not sufficient and they may contain inaccurate information. YouTube can considering categorizing health-related videos separately and integrating comprehensiveness, reliability and quality scales with the existing algorithm to place videos containing useful information in the foreground.

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Declarations

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Conflicts of interest: The authors declare that they have no conflict of interest related to the publication of this manuscript.

Ethics approval: Ethical approval is not applicable, because this article does not contain any studies with human or animal subjects.

Data availability All data will be made available upon request to the corresponding authors.

Code availability Not applicable.

Consent to participate Not applicable.

Consent for publication All authors agreed with the content and gave explicit consent to submit.

Authors' contributions: Concept – S.G, P.B.; Design – P.B, S.G .; Supervision – Y.O; Data Collection and/or Processing – S.G, P.B.,Y.O.; Analysis and/ or Interpretation – S.T; Literature Search – P.B,S.T; Writing Manuscript – S.G, P.B.,Y.O.; Critical Review – P.B, S.T.

Funding: This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Tables

Table 1: Assessment tools for the reliability, comprehensiveness and Global Quality Scale scores of YouTube videos on shoulder exercises after breast cancer surgery

Reliability (1 point per question if answered yes)

1. Are the explanations given in the video clear and understandable?
2. Are useful reference sources given? (publication cited, from valid studies)
3. Is the information in the video balanced and neutral?
4. Are additional sources of information given from which the viewer can benefit?
5. Does the video evaluate areas that are controversial or uncertain?

Global Quality Scale

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

Comprehensiveness (0.5 point per each covered in the video)

1. Explain the importance of shoulder movement after breast cancer surgery
2. Describe the timing of exercise after surgery
3. Describe posture exercises
4. Describe stretching exercises
5. Describe range of motion exercises
6. Describe strengthening exercises
7. Explain the duration, frequency, technique, breath control and pain limits of exercises
8. Mention situations that necessitate the interruption of the exercise program
9. Signify the importance of undertaking regular training
10. Encourage patients to engage in exercise activities

Table 1. Analyses of video characteristics by usefulness

Table 3. Pairwise comparisons of video sources

	<i>p value</i>									
	Source 1-2	Source 1-3	Source 1-4	Source 1-5	Source 2-3	Source 2-4	Source 2-5	Source 3-4	Source 3-5	Source 4-5
Views per day	1.000	1.000	1.000	0.350	0.045	1.000	0.003	1.000	1.000	0.399
Number of likes	0.374	0.099	0.964	0.184	0.027	0.201	0.272	0.017	0.623	0.070
Reliability score	1.000	0.035	0.217	0.018	<0.001	0.121	<0.001	1.000	1.000	1.000
Comprehensiveness score	1.000	0.011	0.229	0.007	<0.001	0.507	<0.001	1.000	1.000	1.000
GQS score	1.000	0.042	0.275	0.038	<0.001	0.080	<0.001	1.000	1.000	1.000

Values of $p < 0.05$ were accepted as significant and are marked in bold. GQS: Global Quality Scale

Source 1: Government/news agencies, Source 2: Universities/professional organizations/physicians/physiotherapists, Source 3: Independent health information websites, Source 4: Medical advertisements/for-profit companies, Source 5: Patients/individuals

Figures

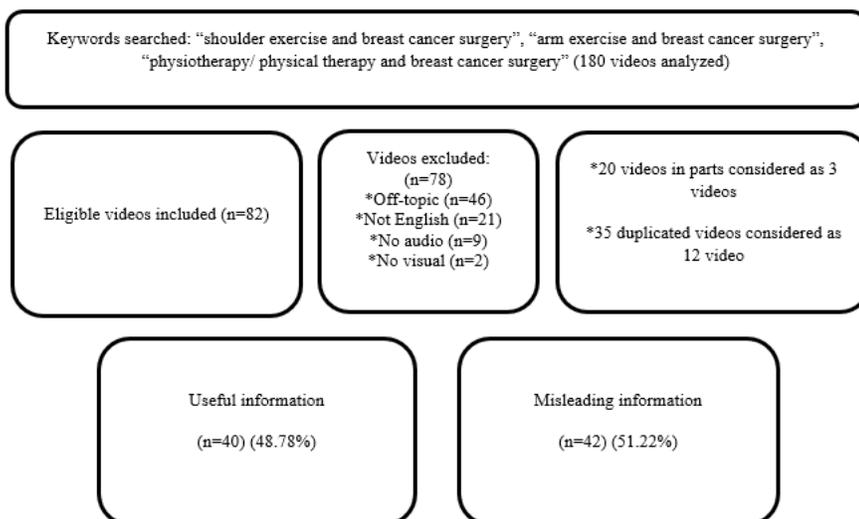


Figure 1

Selection of relevant YouTube™ videos for stoma care

Characteristic	Useful information	Misleading information	p
Number of videos, n (%)	40 (48.8)	42 (51.2)	
Audience interaction parameters			
Total views, n (%)	5,046,269 (74.3)	1,746,023 (25.7)	
Video length, min*	10.42 (5.01-25.54)	9.71 (2.20-20)	0.139 ¶
Number of views, n*	43,889.50 (1225-1,133,310)	6055 (341-515,000)	<0.001 ¶
Time since upload, months*	57 (15-114)	38 (3-126)	0.022 ¶
Days on air*	1733 (447-3440)	1143 (80-3836)	0.018 ¶
Views per day, n*	240 (10-4050)	82 (6-12291)	0.004 ¶
Likes*	28 (0-3300)	10 (0-1841)	0.078 ¶
Dislikes*	2 (0-100)	0 (0-389)	0.020 ¶
Comments*	1 (0-152)	0 (0-243)	0.556 ¶
Reliability score*	4 (2-5)	2 (0-4)	<0.001 ¶
Comprehensiveness score*	3.5 (1.5-5)	2 (0.5-3.5)	<0.001 ¶
GQS score*	4 (3-5)	2 (1-3)	<0.001 ¶
Source of upload, n (%)			
Government/news agencies	2 (5)	-	
Universities/professional organizations/physicians/physiotherapists	32 (80)	10 (23.8)	
Independent health information websites	3 (7.5)	20 (47.6)	
Medical advertisements/for-profit companies	2 (5)	3 (7.1)	
Patients/individuals	1 (2.5)	9 (21.4)	
Gender of presenter, n (%)			
Male	6 (15)	4 (9.5)	0.514 ¶
Female	34 (85)	38 (90.5)	
Presenter category, n (%)			
Physician	7 (17.5)	4 (9.5)	0.079 ¶
Non-physician healthcare professional	23 (57.5)	17 (40.5)	
Individual	3 (7.5)	11 (26.2)	
Off-camera commentary	7 (17.5)	10 (23.8)	
Target audience, n (%)			
Healthcare professionals	1 (2.5)	0 (0)	
Patients	38 (95)	42 (100)	
Unclassified	1 (2.5)	0 (0)	

Values of p < 0.05 were accepted as significant and are marked in bold. GQS: Global Quality Scale. *Median (min-max), ¶ Mann-Whitney U test, £ Chi-square test, ¶ Fisher's exact test

2. Characteristics of videos on shoulder exercise after breast cancer surgery according to upload source

Characteristic	Government/news agencies	Universities/professional organizations/physicians/physiotherapists	Independent health information websites	Medical advertisements/for-profit companies	Patients/individuals	p**
Number of videos, n (%)	2 (2.4)	42 (51.2)	23 (28)	5 (6.1)	10 (12.2)	
Total views, (%)	212,534 (3.1)	4,831,185 (71.1)	1,030,664 (15.2)	592,165 (8.7)	125,744 (1.9)	
Video length*	5.72 (5.44-6.01)	10.30 (2.20-25.54)	10.10 (3.31-20)	10.17 (8.32-13.20)	10.11 (4.24-16.38)	0.357
Number of views*	106,267 (10,120-202,414)	31,001.50 (1,638-1,133,310)	7,342 (374-412,145)	12,446 (1,225-515,000)	4,138.50 (341-469,509)	0.062
Time since upload, months*	26 (18-34)	53 (3-114)	40 (5-123)	21 (7-60)	60 (20-126)	0.154
Days on air*	751 (511-991)	1,575 (80-3,440)	1,206 (143-3,739)	605 (179-1,761)	1,816 (600-3,836)	0.171
Views per day*	2031.50 (102-3,961)	199 (14-4,050)	61 (10-3,644)	206 (20-12,291)	31 (6-149)	0.029
Likes*	247.50 (35-460)	23.50 (0-3,300)	5 (0-1,624)	185 (8-1,841)	10 (1-98)	0.039
Dislikes*	46 (4-88)	2 (0-100)	0 (0-389)	9 (0-231)	0 (0-2)	0.067
Comments*	6 (0-12)	1 (0-82)	0 (0-243)	51 (0-156)	0.50 (0-11)	0.129
Reliability score*	4.50 (4-5)	3.50 (2-5)	2 (1-4)	2 (1-3)	2 (0-3)	<0.001
Comprehensiveness score*	4.75 (4.5-5)	3.5 (1.5-5)	2 (0.5-3.5)	2.5 (1-5)	1.75 (1-2.5)	<0.001
GQS score*	4.50 (4-5)	4 (3-5)	2 (1-3)	2 (1-4)	2 (1-3)	<0.001

Values of p < 0.05 were accepted as significant and are marked in bold. GQS: Global Quality Scale. *Median (min-max), **Kruskal-Wallis test