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# Reliability and Quality of YouTube Videos about Breast Cancer Uploaded During COVID-19 Pandemic

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## Abstract

**Objective:** During the era of COVID-19 pandemic, breast cancer patients inevitably seek information about the course of their disease, while they have limited access to hospitals. Online platforms, especially YouTube, have been a very rich source of information for patients. We aimed to evaluate the videos in YouTube related with breast cancer and COVID-19 released during the first 6 months of the pandemic and to determine their reliability and quality for patients and healthcare providers in circumstances of the pandemic.

**Methods:** A YouTube search was performed by using search terms 'breast cancer, COVID-19', 'breast cancer, Corona' and 'breast cancer, pandemic'. Videos in English language were evaluated for inclusion. Duplicated videos were not included. A playlist containing 142 videos was created. Videos were categorized according to their content (informative, patient experience, news), source of upload and their target audience. Video characteristics (number of views, duration, likes, dislikes, comments) were noted. Reliability and quality of videos were assessed by validated tools (DISCERN, VIQI scores, respectively).

**Results:** Informative videos had significantly higher DISCERN scores when compared with patient experience and news videos. News videos had significantly higher scores in 'flow of information' parameters, when compared with other subgroups. Informative videos had significantly higher and patient experience videos had significantly lower information accuracy scores when compared with other groups.

**Conclusion:** YouTube is a very rich source of medical information for breast cancer patients during the lockdown. Even though there are useful videos for patients, many unreliable videos are uploaded by non-professional individuals, as well.

**Keywords: Breast cancer; COVID-19; Health services**

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## Introduction

In December 2019, a Coronavirus subtype, later named as COVID-19, emerged in Wuhan, China and affected almost every country in the world with more than 5 million people infected and more than 350,000 people deceased [1]. During these pandemic, daily routines of people, especially patients have changed drastically and reaching the hospitals has become limited. Many surgeries, radiotherapy and chemotherapy sessions are postponed and cancer patients are particularly concerned by these changes that cause delay in their planned treatments.

As known; breast cancer is one of the leading causes of morbidity and mortality and is the most commonly encountered malignancy among the female population [2]. During this era of pandemic, breast cancer patients inevitably seek information about the course of their disease, while they have limited access to hospitals. Online video platforms, including YouTube which was launched in 2005, is the most commonly used among all video sharing platforms, have been a major source of informative and also misleading medical information [3]. The quality of content in YouTube gains even more importance during these times where patients cannot attend their regular appointments with their healthcare providers. Even though there are many informative and reliable contents uploaded by professionals healthcare providers, misleading and unreliable information are also present and these videos may harm breast cancer patients both clinically and psychologically.

In this study, we aimed to evaluate the videos in YouTube related to breast cancer and COVID-19 which was released during the first 6 months of the pandemic, and to determine their reliability and

quality for patients and healthcare providers.

## Methods

A YouTube search was conducted on May 22nd, 2020 and performed by using search terms 'breast cancer, COVID-19', 'breast cancer, Corona' and 'breast cancer, pandemic'. Videos in English language were evaluated for inclusion. Duplicated videos were not included. A playlist containing 142 videos was created.

### Classification of videos

Videos were categorized into three categories according to their contents. The categories were determined as 'informative', 'patient experience' and 'news'. The target audience of the videos was also classified as 'healthcare providers' and 'patients'. The up loaders of the videos were classified as 'professional individuals', non-professional individuals', 'news agencies' and 'hospitals and academic centers'. Video characteristics were noted in terms of 'video duration', 'number of views', number of 'likes' and 'dislikes' and 'days passed since upload'.

### Evaluation of reliability and quality

Reliability of videos was evaluated by 'modified five point DISCERN tool [4]. '1' point was given for each of the following criteria if the answer to the question is 'Yes' and '0' point was given if the answer is 'No'.

### DISCERN tool

1. Were aims clear and achieved?
2. Were the sources of information reliable?
3. Is the information balanced and unbiased?
4. Are additional resources to learning provided?
5. Does the video address areas of controversy/uncertainty?

Quality of videos were assessed by Video Information and Quality Index (VIQI), which is a modified version of 'Global Quality Scale (GQS)' [5,6]. The VIQI scale was created to evaluate the quality of videos, specifically. Each criteria of VIQI scale was given a point from 1 (poor quality) to 5 (high quality).

### Video information and quality index (VIQI)

- Flow of information
- Information accurac
- Quality (one point each for use of still images, use of animation, interview with individuals in the community, video captions, and use of a report summary),
- Precision (level of coherence between video title and content).

Two independent physicians (BAU, CS) graded the videos for reliability and quality assessment and final scores were achieved by consensus. Since YouTube is a public website, and the study does not include any patient data, Institutional Review Board approval was not obtained.

### Statistical analysis

Statistical analysis was done using Statistical Package for the Social Sciences (SPSS version 25). Normality of distribution of the variables was checked by Shapiro-Wilk test and Q-Q plots. ANOVA test was used for comparison of the normally distributed variable between the 3 groups, and Kruskal-wallis test was used for none normally distributed data. Post-hoc analysis was used for comparison between groups. The Tukey test was used in the groups with normal distribution, and the Games Howell test was used in the groups without normal distribution. P values represent two-sided statistical tests with statistical significance at $p<0.05$.

## Results

Among 142 videos included in the study, 96 (67%) videos were 'informative', 26 (18%) videos were 'patient experience' and 20 (14%) videos were 'news' videos. Number of views were significantly different between groups (p=0.001) and news videos had remarkably higher numbers of views. Groups had significantly different DISCERN scores (p=0.001) and the mean DISCERN score of informative videos were higher when compared with other groups. Characteristics of the videos in different content categories were compared and results are listed in Table 1.

Pairwise comparison of groups was performed for parameters which were identified to be significant. Informative videos were significantly longer and news videos were significantly shorter in duration, when compared to other groups. Informative videos had significantly higher DISCERN scores when compared with patient experience and news videos. Pairwise comparison of different parameters is listed in Table 2.

The quality assessment of videos was performed by VIQI scoring system and results are listed in Table 3. Being the lowest possible score in the scoring system as 5 and the highest possible score as 25, the mean total VIQI score was identified as 16.0 ± 2.5. Comparison of video qualities in different content categories was performed and results are listed in Table 4. Total VIQI score of each group and the scores of 'flow of information', 'information accuracy' and 'quality' criteria were significantly different among groups. The precision score (level of coherence between video title and content) was comparable among groups.

Pairwise comparison of VIQI parameters, which were identified to be significantly different among groups, was performed. News videos had significantly higher scores in 'flow of information' parameter, when compared with other subgroups. Informative videos had significantly higher and patient experience videos had significantly lower information accuracy scores when compared with other groups. Results of these pairwise comparisons are listed in Table 4.

## Discussion

Breast cancer is a very common health problem being the leading type of cancer in women with high morbidity and mortality rates, with 245,000 new cases diagnosed each year, according to Centers for Disease Control and Prevention (CDC) data visualizations [2]. Early diagnosis and treatment remains a very important aspect of breast cancer management and restricted access to hospitals during pandemic is a major concern for patients and their relatives. Patients tend to seek information online and YouTube remains to be a very important source of both useful and misleading information. In this perspective; we aimed to evaluate the videos regarding breast cancer and COVID-19, in terms of their characteristics and quality, to gain insight about their usefulness during the pandemic era.

There are studies in the literature which have evaluated the importance of social media and YouTube for breast cancer.

**Table 1:** Analysis of video characteristics by content category.

| Characteristics | Informative | Patient experience | News | p |
|---|---|---|---|---|
| **Number of videos** | 96 | 26 | 20 | |
| **Audience interaction parameters*** | | | | |
| Number of views | 145.4 ± 208.2 | 329.2 ± 289.7 | 2820.6 ± 6123.1 | 0.001 |
| Video length (min) | 22.1 ± 21.5 | 7.7 ± 8.9 | 3.1 ± 2.0 | 0.001 |
| Duration on YouTube (days) | 39.0 ± 18.8 | 31.1 ± 17.4 | 41.4 ± 17.7 | 0.101 |
| Views per day | 3.7 ± 4.6 | 13.3 ± 15.1 | 89.4 ± 228.2 | 0.001 |
| Likes | 2.6 ± 4.7 | 10.5 ± 12.6 | 37.1 ± 76.9 | 0.001 |
| Dislikes | 0.1 ± 0.3 | 0.3 ± 0.7 | 3.0 ± 6.5 | 0.001 |
| Comments | 0.5 ± 2.6 | 3.0 ± 4.4 | 19.3 ± 47.7 | 0.001 |
| **DISCERN score*** | 3.4 ± 0.9 | 1.1 ± 0.4 | 1.8 ± 1.1 | 0.001 |
| **Source of upload** | | | | 0.001 |
| Professional individuals | 19 | - | - | |
| Non-professional individuals | 69 | 20 | - | |
| News agencies | 2 | 5 | 20 | |
| Hospitals, Academic centers | 6 | 1 | - | |
| **Target audience** | | | | 0.010 |
| For doctors and healthcare providers | 17 | - | - | |
| For patients | 79 | 26 | 20 | |

*mean ± standard deviation

**Table 2:** Pairwise comparisons of video groups according to content.

| Characteristics | p value | | |
|---|---|---|---|
| | **Informative *vs.* Patient experience** | **Informative *vs.* News** | **Patient experience *vs.* News** |
| Number of views | 0.013 | 0.151 | 0.19 |
| Video length (min) | 0.001 | 0.001 | 0.048 |
| Views per day | 0.01 | 0.239 | 0.318 |
| Likes | 0.01 | 0.138 | 0.299 |
| Dislikes | 0.313 | 0.128 | 0.168 |
| Comments | 0.021 | 0.209 | 0.304 |
| Source of upload | 0.001 | 0.001 | 0.001 |
| Target audience | 0.022 | 0.041 | NA |
| DISCERN | 0.001 | 0.001 | |

Values of p<0.05 were accepted as significant and marked bold

**Table 3:** Detailed content analysis of videos based on VIQI scores and pairwise comparison of groups.

| | Mean VIQI score | Informative | Patient experience | News | p |
|---|---|---|---|---|---|
| Flow of information | 4.2 ± 0.9 | 4.1 ± 0.9 | 3.9 ± 0.9 | 4.8 ± 0.6 | 0.002 |
| Information accuracy | 4.4 ± 1.0 | 4.8 ± 0.7 | 3.2 ± 1.1 | 4.0 ± 0.9 | 0.001 |
| Quality | 2.7 ± 0.9 | 2.5 ± 0.8 | 2.6 ± 1.2 | 3.5 ± 0.6 | 0.001 |
| Precision | 4.8 ± 0.6 | 4.8 ± 0.6 | 4.8 ± 0.5 | 4.9 ± 0.5 | 0.418 |
| **Total VIQI score** | 16.0 ± 2.5 | 16.3 ± 2.2 | 14.5 ± 3.1 | 17.2 ± 1.9 | 0.001 |

*mean ± standard deviation

Brachtenbach et al. [7] investigated the quality of YouTube videos relating to breast cancer and developed their own scoring system for quality assessment. They have individually attended scores for different components of videos including screening, risk factors, symptoms, diagnosis, classification and management. After evaluating 133 videos, they have concluded that many of the videos contain misleading and false statements and high quality videos with reliable information are needed. A different study conducted by Basch et al. [8] assessed the YouTube videos regarding mammography for breast cancer screening. They have evaluated 173 videos by their numerical characteristics and also presence or absence of information regarding different components of mammography, including preparing for the test, pain, emotional component, last mammography visit, test results, age and medical/family history. They have concluded that misleading information is present in many videos and new ways should be developed in the future for patients to identify the reliable video from the videos with misleading and false information.

The DISCERN tool was initially developed in 1999 by Charnock,

**Table 4:** Pairwise comparisons of video groups according to VIQI scores.

| | p value | | |
|---|---|---|---|
| | **Informative *vs.* Patient experience** | **Informative *vs.* News** | **Patient experience *vs.* News** |
| Flow of information | 0.621 | 0.001 | 0.002 |
| Information accuracy | 0.001 | 0.006 | 0.018 |
| Quality | 0.989 | 0.001 | 0.007 |
| Total VIQI score | 0.022 | 0.13 | 0.002 |

Values of p<0.05 was accepted as significant and marked bold

in order to evaluate the quality of written medical information [9]. Many studies in the literature adopted this reliability score to assess the medical content in certain resources. In our study, we have detected a very high number of informative videos in YouTube with high reliability scores. However, informative videos had remarkably lower number of views when compared with patient experience and news videos. This was partly due to higher subscribers to the channels of news agencies and individuals with breast cancer, in contrast to lower subscribers of health care professionals and academic centers. So, highly useful and reliable information should reach a higher number of viewers, by promoting these channels with new solutions. Additionally, even though news videos had a remarkably higher mean number of views when individually compared with informative and patient experience videos, because of the presence of extreme values in regards to number of views; the p value was not statistically significant due to the non-normal distribution pattern among news videos.

Quality assessment of online contents was performed by several authors in the literature. As an example, Nagpal et al. [5] analyzed the reliability and quality of YouTube videos as a source of medical information during the Ebola hemorrhagic fever epidemic. They have created new scales (VIQI and MICI) to assess the quality of videos by their overall video quality and medical content. These scales are revised versions of GQS, which was originally developed to evaluate the quality of websites [6]. Our quality assessments revealed a clear superiority of informative videos over news videos in information accuracy score. However, news videos scored significantly higher in flow of information and quality scores, when compared with informative videos. We emphasize that these results are due to the structured, high quality content and professional production of news agencies, with regards to healthcare providers, which are commonly the main presenters in informative videos. These informative videos can reach more number of views by integrating more images, video captions and animations, which will attract more attention by the viewers and facilitate the spread of reliable and useful information.

The source of upload is another important variable, regarding the reliability of the uploaders and the gaining the confidence of the viewer. Vast majority of the videos were uploaded by non-professional individuals and news agencies (62% non-professional individuals, 19% news agencies). Even though the uploaders were non-professionals, the majority of the speakers in those videos were either doctors or healthcare providers. This improves their reliability and the quality of information contained in the video. We emphasize that the most reliable source of upload is the academic centers and hospitals, which represent the most agreed-upon medical information that can be presented to the public. However, the least number of videos were uploaded by these professional centers (0.4%) and increasing these informative and truly useful videos would benefit most for the breast cancer patient population.

Our study has several limitations. The reliability and quality scores were determined by two independent physicians and final scores were reached by consensus meeting by the same interpreters. Instead, assessment of intra-observer and inter-observer variability would be a more reliable interpretation of data. Due to the limited number of videos uploaded during a short period of time, further studies with higher number of content, would reveal more trustworthy results. However, we intently chose the first 6 months period of the COVID-19 pandemic since there was no general consensus about the treatment and surgical planning of breast cancer patients.

In conclusion, YouTube is a very rich source of medical information for breast cancer patients. Even though there are useful videos for patients, many unreliable videos are uploaded by non-professional individuals, as well. Increasing the videos uploaded by professional individuals and academic centers would be very useful for patients, especially in times like pandemic, where hospital access is limited.

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