Evaluation of Breast Cancer Videos on Youtube in the Arab World

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Abstract

Background

Patients are increasingly using YouTube™ as a source of information on Breast cancer, the most frequent cancer among women. Educating patients is highly important to reduce mortality rates. This study aims to evaluate, for the first time, Breast Cancer Videos on YouTube™ in the Arab world that hosts their highest use.

Methods

In this cross-sectional study, the most viewed 60 videos were evaluated for global quality (GQS score), reliability (modified DISCERN score), usefulness (content-specific score), and misleading claims. Videos’ power index, popularity, duration, and viewers’ interaction were assessed. Sources (professional/ non-professional) and speakers (physician/ non-physician) were categorized.

Results

The median Global Quality (3/5), Reliability (2/5), and Usefulness scores (4/11) were overall low. Out of all videos, the speaker was a physician in 32% and misleading information was found in 42%. Although professional source videos (45%) were less viewed, they were less misleading, of higher quality, reliability, and usefulness than non-professional source videos (55%). Source categories did not affect viewers’ interaction, video power index, nor duration. While Symptoms (55%) were discussed the most, genetic counseling (13%) and prevention (20%) were scarcely mentioned; professionals were more likely to highlight early diagnosis importance.

Conclusions

YouTube™ is poorly informational on breast cancer and may be inaccurate in the Arab world where highly used. Although professional uploaders’ videos tend to be more adequate, they are of lower quantity and popularity. Governments and physicians should upload more intelligibly informational videos, guide the public for accurate sources, and encourage regulations.

Background

Breast cancer is the most frequent cancer among women, impacting 2.1 million women each year, and also causes the greatest number of cancer-related deaths among women. It is increasing particularly in developing countries where the majority of cases are diagnosed in late stages [1]. Educating patients accurately, on early diagnosis and advances in treatments, is of high importance for its ability to substantially reduce mortality rates [2].

With the growing popularity of online platforms, using the Internet as a source to access health-related information has increased among the population [3–5]. Particularly, YouTube™ users constitute 95% of all...
internet users and it represents one of the most popular social network sites for sharing video content. The number of videos containing medical information is increasing [6–8]. Similarly, patients are increasingly referring to YouTube™ health-related videos as it represents an easily accessible education tool [9]. The case is especially true with regard to breast cancer [10, 11]. While the rates of Internet usage among breast cancer patients have been reported between 42% and 49%, the information obtained is not discussed with their physicians [11, 12].

However, the medical content available on YouTube™ is not properly examined and may be inaccurate, nay misleading. Previous studies have examined YouTube™ videos on different health issues such as food poisoning, oral leukoplakia, cervical cancer, prostate cancer, and rheumatoid arthritis [13–17]. While some information related to certain topics has been found to be useful, other information has been found to be incomplete and questionable. The dissemination of such information can mislead the population into behaviors that are harmful to health [7].

According to Google Trends, a platform that assesses the popularity of online topics throughout the globe, Breast cancer is the most popular cancer on YouTube™ and is being searched for the most by the Arab population (Fig. 1) [18, 19].

To date, no study has been carried out to examine any medical information on YouTube™ in the Arab World. Particularly, there is no previous study to investigate the Arabic content of breast cancer-related videos in the Arab world where the subject is of particular interest to internet users. Given that it is essential to do so, this study aims to report an evaluation of the content, quality, reliability, and usefulness of Videos related to breast cancer on YouTube™ in the Arabic language. Additionally, findings could serve as a guide for healthcare providers, awareness campaigns, and policy regulations.

**Methods**

In this cross-sectional study, YouTube™ was searched on the 20th of May 2020, using the keyword “Breast Cancer” in Arabic (بَرِضَةُ التَّضِيّق). Considering that more than 95% of users performing a search on YouTube™ do not watch more than the first 100 videos provided, the first 100 videos were selected for preliminary analysis [20–25]. After sorting videos by “view count” and saving them in a playlist, the following information was extracted from each video: upload date, number of views, number of likes, number of dislikes, and duration. Based on these data, Video Power Index was calculated using the formula: \[
\text{Video Power Index} = \left(\frac{\text{number of likes}}{\text{number of likes} + \text{dislikes}}\right) \times 100.
\]

The Viewers Interaction was assessed via the formula: \[
\text{Viewers Interaction} = \left(\frac{\text{number of likes} - \text{number of dislikes}}{\text{number of views}}\right).
\]

As videos were uploaded on different dates, the viewing rate was examined by dividing the number of views by the number of days since the video was uploaded.

The inclusion criteria were: (1) Arabic videos; (2) videos available on the 20th of May 2020; (3) videos related to female breast cancer. The exclusion criteria are: (1) non-Arabic videos; (2) advertisements; (3) music clips; (4) videos not related to breast cancer such as music, gaming, or others; (5) duplicate videos.
The videos were separated into two groups according to the source of the upload: Professional source (government/news agencies/university channels/non-profit-physician) and Non-professional source (stand-alone health channels, individuals).

Included videos were evaluated for overall quality (GQS score – Table 1), reliability (modified DISCERN score – Table 1), and usefulness (Table 1). Additionally, videos that shared any information not verified by the American Society of Cancer [26] were classified as Misleading.

The GQS score (Table 1) was proposed by Bernard et al. to assess the overall quality of the video. It is a five-point scale based on the quality of information, the flow and ease of use of the information present online [27].

| Global quality scale (5-points scale) | Poor quality, poor flow, most information missing, not helpful for patients |
|-------------------------------------|--------------------------------------------------------------------------|
|                                     | Generally poor, some information given but of limited use to patients      |
|                                     | Moderate quality, some important information is adequately discussed       |
|                                     | Good quality good flow, most relevant information is covered, useful for patients |
|                                     | Excellent quality and excellent flow, very useful for patients             |

| Reliability (1 point per question if answered yes) | Are the explanations given in the video clear and understandable? |
|---------------------------------------------------|------------------------------------------------------------------|
|                                                   | Are useful reference sources given? (publication cited, from valid studies) |
|                                                   | Is the information in the video balanced and neutral?             |
|                                                   | Are additional sources of information given from which the viewer can benefit? |
|                                                   | Does the video evaluate areas that are controversial or uncertain? |

| Usefulness Score | Definition (1 point if mentioned) |
|------------------|-----------------------------------|
|                  | Statistics and Epidemiology (1 point if mentioned) |
|                  | Symptoms (1 point if partially mentioned, 2 points if fully mentioned) |
|                  | Risk Factors (1 point if partially mentioned, 2 points if fully mentioned) |
|                  | Prevention (1 point if mentioned) |
|                  | Genetic Counseling (1 point if mentioned) |
|                  | Screening and Diagnosis (1 point if partially mentioned, 2 points if fully mentioned) |
|                  | Treatment (1 point if mentioned) |

**Table 1 - Evaluation tools for global quality, reliability, and usefulness of the YouTube™ videos on Breast Cancer**
The reliability of the videos was evaluated by a questionnaire proposed by Singh et al. [14] (a modified 5-point DISCERN adapted from the original DISCERN tool [29]). For each aspect addressed, videos receive 1 point, with possible scores ranging from 0 to 5 points (Table 1).

The evaluation of the videos' usefulness was based on the amount of accurate information on important topics related to Breast Cancer. The usefulness score (Table 1) is a customized content-specific score created by the team. The team considered the information available on the “Breast Cancer Basic Information” section of the CDC website a gold standard [29]. Scores ranged from 0 to 11. Based on the sum of the points, the videos were classified as: Not Useful (score 0–2), Somewhat Useful (score 3–5), Moderately Useful (score 6–8), or Very Useful (score 9–11).

The evaluation of all videos was performed independently by two examiners (GA and EC). After comparing the data, discrepancies were discussed with a third examiner (HRK).

The analysis was run using IBM SPSS Statistics for Windows, version 22.0 (IBM Corp., Armonk, NY). Data distribution was assessed using a Shapiro–Wilks test. Descriptive statistics were reported including medians (1st quartile–3rd quartile) for continuous variables and percentages for categorical variables. Mann-Whitney U test was used for the numerical variables, while correlation analysis was performed using Pearson correlation analysis. For the comparison of categorical variables, the Chi-square was used. A two-tailed p-value < 0.05 was deemed statistically significant.

**Results**

Using the keyword of “Breast Cancer” in Arabic (بَصَّةُ الْبَنْثُوِتْ), the first 100 most viewed videos on YouTube™ were examined, of which 60 were included in the study for further analysis. A total of 40 videos were excluded as they were irrelevant (n: 27), not in Arabic (n: 7), music videos (n: 3), advertisement (n: 1), or a duplicate (n: 1).

Among the 60 included videos, 27 videos (45%) were uploaded by a professional source as the other 33 videos (55%) were uploaded by a non-professional source. The speaker was a physician in 19 videos (32%). Additionally, 11 videos (18%) were made by patients for a cancer testimonial purpose (personal reports). The median duration of the videos was 5.95 minutes (2.94–11.99). The 60 videos have been viewed a total of 21'514'441 times; the median number of views per video is 203'146 views (210 views per day). At least one misleading information was found in 25 videos (42%). The Distribution of Videos by country source is showed in Fig. 3. The median GQS, Reliability, and Usefulness scores of the videos were 3 (2–3), 2 (2–3), 4 (2–5) respectively. While only 3 videos (5%) were classified as very useful, 22 videos (37%) were not useful, 25 (41%) were somewhat useful, and 10 (17%) were moderately useful.

The classification of videos according to source category with details of other characteristics is given in Table 2. There was no significant difference between source category and duration, viewers interaction, or video power index (p = 0.637, p = 0.081, p = 0.490, respectively). A statistically significant difference was determined in favor of the non-professional source in respect of the viewers per day (p < 0.05). However,
videos uploaded by a professional source had significantly higher GQS score, reliability score, and usefulness score \((p < 0.05)\).

### Table 2
The classification of videos according to the source category

|                           | Professional Source | Non-professional Source | P-value |
|---------------------------|---------------------|-------------------------|---------|
| **Number of Videos**      | 27 \((45\%)\)       | 33 \((55\%)\)          |         |
| **Views**                 | 163,454 \((71,615 - 340,539)\) | 327,488 \((128,572 - 567,351)\) | 0.017   |
| **Views per day**         | 123 \((68.8-271.2)\) | 320 \((71-595.8)\)    | 0.001   |
| **Duration in minutes**   | 6.57 \((2.78-16.38)\) | 5.03 \((2.98-10.42)\) | 0.637   |
| **Viewers Interaction**   | 0.47 \((0.2-0.6)\)  | 0.63 \((0.3-1.4)\)    | 0.081   |
| **Video Power Index**     | 90 \((89-93)\)      | 93 \((87-94)\)        | 0.490   |
| **Global Quality Scale**  | 3 \((3-4)\)         | 2 \((1-3)\)           | 0.007   |
| **Reliability Score**     | 2 \((2-3)\)         | 2 \((2-2)\)           | 0.003   |
| **Usefulness Score**      | 4 \((2-6)\)         | 3 \((2-4)\)           | 0.001   |
| **Misleading Videos**     | 4 \((15\%)\)        | 21 \((64\%)\)         | 0.001   |
| **Physician Speaker**     | 14 \((52\%)\)       | 5 \((15\%)\)          | 0.002   |

*Variables are presented as median \((Q1-Q3)\) or frequency \((\%)\) values; Bold values indicate the significance of \(p < 0.05\)*
The frequency of misleading videos was significantly higher in the Non-professional source group (64%) than in the professional source group (15%) (p < 0.05). Non-physician speakers shared significantly more misleading information (56%) than Physician speakers (11%) (p < 0.05). While a Physician was speaking in 52% of the videos uploaded by a professional source, the number is significantly lower (15%) in the videos uploaded by a non-professional source group (p < 0.05).

The duration of the videos did not influence the scores (p = 0.200, p = 0.088, p = 0.244) nor the number of viewers per day (p = 0.153). However, it was positively correlated with viewers' interaction (p < 0.05). While both of the GQS and the usefulness scores were negatively correlated with viewers per day (p < 0.05), the reliability score was not (p=-0.254).

The distribution of breast cancer information among the videos according to the source category is shown in Fig. 4. The Symptoms topic was discussed the most (55%). However, genetic counseling concept and basic prevention measures were only mentioned in 13% (n: 8) and 20% (n: 12) of the videos.

**Discussion**

To the best of our knowledge, this study is the first in the literature to evaluate YouTube™ videos in the Arab world in general, on the topic of Breast Cancer in particular. Given the high prevalence of breast cancer, patients are expected to seek information about the subject. According to Google Trends, a platform that assesses the popularity of online topics throughout the globe, Breast cancer is the most popular cancer on YouTube™. Of all countries, the Arabic-speaking countries are searching the most for breast cancer on YouTube™ (Fig. 1). This might be particularly due to the culturally sensitive nature of the inquiry in a conservative environment; other reasons may include distrust in the healthcare system, lack of information providers, and a high prevalence of the disease. The Arab world is made up of 19 countries, a combined population of 420 million people, all of which list Arabic as their official language. While breast cancer incidence rates in Arab women have increased during the last 24 years, women are still being diagnosed with Breast Cancer at more advanced stages of the disease. However, early diagnosis and treatment are associated with a reduction in negative outcomes caused by breast cancer. For this purpose, providing the population with accurate information on breast cancer plays a particularly important role.

Eight of each ten patients seek the web for health-related information. Despite YouTube™ being an easily accessible tool for patients’ cancer education, the scientific accuracy of the videos is not regulated, and it is known that laypersons are not able to filter out misleading information.

In a study by Isil Yurdaisik, the evaluation of the English content of the most 50 viewed breast cancer-related videos on YouTube™ stated an insufficiency in the quality and the scientific accuracy of the videos. However, our study examined a higher number of videos in a different language that is familiar to the population to which breast cancer is of higher interest on YouTube™. Besides, our study used more evaluation tools and has closely investigated the distribution of the information provided on the different aspects of breast cancer (Fig. 3).
In our study, the high number of total views (21,514,441) emphasizes the popularity of the subject. However, the videos evaluated were poorly reliable and their content is poorly useful for patients. Their global quality was generally poor to moderate.

Interestingly, videos uploaded from a professional source were more useful for patients, of higher quality, more reliable, and less misleading than those uploaded from a non-professional source. Nevertheless, videos uploaded from a non-professional source tended to be more popularly viewed despite being of lower quality. Reasons may be due to the complexity of medical language used by physicians, the attractive feature of controversial information, and the inability of patients to discern useful information. That being said, healthcare providers, governments, and universities should be encouraged to upload more videos to help people to reach complete and accurate information. The healthcare providers should urge their patients to check the source of their online information and guide them to trustful sources from which they could benefit. Moreover, they are recommended to use a simplified language in an attempt to make the accurate information given more intelligible.

Different rates of source categories have been reported in studies on different topics in the literature. In a study by Gokcen et al. evaluating YouTube™ videos about disc herniation, physicians uploaded more videos (48%) than in our study [36]. However, similar to our study, other studies have reported lower rates [35, 37]. The differences might be due to the topic in question, as cancer topics remain more controversial to and discussed by laypersons than other diseases.

Alarmingly, a significant portion of videos (42%) shared scientifically inaccurate information such as inadequate screening protocols, disproven risk factors and treatment options. Although misleading information was mostly shared by non-professional sources (individuals and stand-alone health channels), more than half of the videos belonged to that source category. For this purpose, policy makers should be encouraged to develop strategies and regulations in order to hinder the spread of misleading information [38].

Tolu et al. claimed in their study that the anti-TNF agent injection videos on YouTube™ were reliable and could be used in patient education [39]. A study by Mengi et al. argued that YouTube™ is a promising source of information on food poisoning [16]. However, in a study by Sahin et al., the authors concluded that YouTube™ may not be a suitable educational source for colorectal cancer patients [40]. Similarly, in a study on prostate cancer by Corey et al., YouTube™ content was found to be inaccurate [24]. The results of this study support the raise of concerns about the quality and accuracy of cancer content on YouTube™ and extend them to the Arab World, where no previous study has evaluated any medical information on YouTube™ to date.

Although the non-professional source and non-physician speaker videos shared a poor amount of information regarding all the topics in general, they shared particular interest on Breast cancer symptoms. However, professional source and physician speaker videos have shed more light on the screening and early diagnosis protocols. Even though more than half of the videos discussed the symptoms of breast
cancer adequately, early diagnosis before the stage of symptoms is associated with a substantial reduction in negative outcomes caused by breast cancer [26, 29].

Despite being very poorly discussed on YouTube™, basic prevention measures, such as maintaining a healthy lifestyle, are known to lower the risk of the disease [26, 29]. Although inherited genetic mutations account for 10–15% of breast cancer cases, mutation carriers or at-risk patients are subject to tailored screening and treatment guidelines [41]. Screening this subgroup of patients in the same way of not-at-risk patients is a harmful practice [41]. Of all videos, only 13% informed viewers about this life-saving concept. The analysis of breast cancer content on YouTube™ should serve as a reminder for information providers to not let down other important aspects of the disease.

A limitation of this study, as with all cross-sectional studies, is the limiting feature of a one data collection point. As YouTube™ is in a dynamic state, the videos with the most views may change over time.

**Conclusions**

In conclusion, YouTube™ serves as a source of information for the population on breast cancer, especially in the Arab World where the topic is of particular interest to users. However, the information provided is of poor quality and may be inaccurate. Although professional source videos tend to be more adequate, they are of lower quantity and popularity. Governments and healthcare providers should upload more intelligibly informational videos, guide the patients for the accurate sources, and encourage regulations.

**Abbreviations**

GQS
Global Quality Scale; CDC: Centers for Disease Control and Prevention

**Declarations**

**Ethics approval and consent to participate**

Not applicable.

**Consent for publication**

Not applicable.

**Availability of data and materials**

The datasets generated during and analyzed during the current study are available in the Figshare repository, [https://figshare.com/s/5a82ed580a6aa1ad4eef](https://figshare.com/s/5a82ed580a6aa1ad4eef)

**Competing interests**
The authors declare that they have no competing interests.

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**Authors’ contributions**

All authors were involved in the conception and design of this study. GA and EC conducted the search, screened all videos for eligibility, and performed data extraction. GA, EC, and HRK performed quality assessments, analyzed, and interpreted the data. GS performed the statistical analysis. GA and EC wrote the drafts of the manuscript and all other authors critically revised the different versions of the manuscript. Moreover, all authors were involved in discussing the results and interpreting the findings. All authors read and approved the final manuscript.

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**Figures**
Figure 1

Breast Cancer Topic on YouTube™: Distribution of Interest by Region [Map taken from: Google Trends (https://trends.google.com/trends/explore?date=today%205-y&gprop=youtube&q=%2Fm%2F0j8hd)].

Note: The designations employed and the presentation of the material on this map do not imply the expression of any opinion whatsoever on the part of Research Square concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. This map has been provided by the authors.
Figure 2

Flow diagram of the selection process

Figure 3

Distribution of Videos by Country source
Figure 4

Distribution of Breast Cancer Information in YouTube Videos