*Research Article / Araştırma Makalesi*

# Are Youtube Videos About Ultrasound-Guided Breast Biopsy Useful and Reliable?

## Ultrason Rehberliğinde Yapılan Meme Biopsi Hakkında Youtube Videoları Yararlı ve Güvenilir Mi?

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**Abstract**

**Background:** The aim of this study is to evaluate the usefulness and quality of YouTube videos on ultrasound-guided breast biopsy (UGBB) for patients.
**Materials and Methods:** A video search was undertaken on YouTube on Aug 14, 2020 using the keywords, 'breast biopsy', 'ultrasound-guided core biopsy', 'breast ultrasound', and 'breast biopsy ultrasound'. Top 100 videos were selected using each keyword (total 400 videos). After applying the exclusion criteria, 51 videos were evaluated by two researchers based on the patient information form of the American Cancer Society and American College of Radiology. According to these criteria, the videos were divided into four categories as very useful, useful, slightly useful, and not useful.
**Results:** Of the 51 videos analyzed, 13.7% (n=7) were very useful, and 41.2% (n=21) were useful. Of the very useful videos, 85.7% (n=6) had been uploaded by physicians/hospitals. The DISCERN reliability score was significantly higher in very useful videos (median: 4, range: 2-5, $p < 0.001$). The length and number of likes and comments were significantly higher for the videos uploaded by civilian individuals ($p=0.005$, $p=0.046$, and $p=0.013$, respectively). Not useful and very useful videos were significantly longer ($p = 0.01$)
**Conclusions:** Although the primary sources of very useful YouTube videos about UGBB were physicians/hospital, a significant portion of slightly useful and not useful videos had also been uploaded by this group. Thus, medical professionals should take care to upload well-informed videos.

**Key Words:** Breast biopsy, core needle, ultrasound-guided, patient information, YouTube

**Öz**

**Amaç**: Bu çalışmanın amacı ultrason rehberliğinde yapılan meme biopsi ile ilgili YouTube videolarının hastalar için yararlılığını ve kalitesini değerlendirmektir.
**Materyal ve Metod:** ''Breast biopsy'', ''ultrasound-guided core biopsy'', ''breast ultrasound'' ve ''breast biopsy ultrasound'' anahtar kelimeleri kullanılarak 14 Ağustos 2020'de YouTube'da video araması yapıldı. Arama sonuçlarındaki 400 video Amerikan Kanser Derneği ve Amerikan Radyoloji Derneği'nin hasta bilgilendirme formu rehber alınarak iki bağımsız araştırmacı tarafından değerlendirildi. Bu kriterlere göre videolar çok faydalı, faydalı, az faydalı ve faydasız olmak üzere 4'e ayrıldı.
**Bulgular:** Analiz edilen toplam 51 videonun %13.7 (n=7)'si çok faydalı ve %41.2 (n=21)'si faydalı idi. Çok faydalı videoların %85.7 (n=6)'si doktor/hastane tarafından yüklenmişti. Güvenilirliği gösteren DISCERN skoru çok faydalı videolarda anlamlı olarak yüksekti (median: 4, aralık: 2-5, $p < 0.001$). Siviller tarafından yüklenen videoların uzunluğu, beğeni ve yorum sayısı anlamlı olarak daha yüksekti (sırasıyla; $p = 0.005$, $p = 0.046$ ve $p = 0.013$).
**Sonuç:** Ultrason rehberliğinde meme biyopsi ile ilgili çok faydalı YouTube videolarının primer kaynağı doktor/hastane olsa da, az faydalı ve faydasız videoların önemli bir kısmının da bu grup tarafından yüklendiği tespit edildi. Bundan dolayı medikal profesyonellerin daha özenli ve donanımlı eğitim videoları yüklemeleri gerekmektedir.

**Anahtar Kelimeler:** Meme biyopsi, Kalın iğne, Ultrason, hasta bilgilendirme, YouTube

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## Introduction

Although in the past, most people obtained medical information from medical professionals, today, many people use online resources as a result of the widespread use of and developments in internet technology. YouTube, one of the users' most preferred video sharing sites, contains videos that provide information about many medical procedures. Established in 2005, YouTube is an unregulated, consumer-created website that allows individuals from around the world to upload, share and watch videos without charge. However, there is no control mechanism that evaluates the reliability, quality and content of the videos. Anyone can upload poor-quality videos with misleading or biased information, thus affecting people negatively (1).

Breast cancer is the most common cause of cancer and cancer-related deaths among women worldwide. The most important factor that reduces mortality associated with breast cancer is the early diagnosis and treatment of lesions (2). Treatment management varies according to the histopathological features of the lesion (e.g., type, grade, invasion, hormonal receptors, and HER-2 NEU), and a surgical biopsy used for diagnosis has now been replaced by a percutaneous breast biopsy performed under imaging guidance. For this purpose, ultrasound-guided breast biopsy (UGBB), which is the most preferred, has become the first choice for most lesions that can be clearly seen on ultrasound (3).

The National Institute for Health and Care Excellence (NICE) stated that women might want to receive various information about breast cancer and suggested that this should be provided through relevant written-visual materials or face-to-face education programs depending on the mental capacity of the patient (4). For the majority of patients referring to online sources for medical information, the reliability and quality of videos must be determined. In recent years, studies have been conducted to investigate the usefulness and quality of YouTube videos related to many diseases and procedures, such as ureteroscopy, sarcopenia, knee replacement, and transrectal ultrasound (TRUS)-guided prostate biopsy (5–8). However, to the best of the authors' knowledge, there is no such study on UGBB. Therefore, this study aimed was to evaluate whether UGBB-related YouTube videos are useful for patients and determine their quality.

## Materials and Methods

For this descriptive study, a video search was made on YouTube (http://www.youtube.com) on Aug 14, 2020. The keywords used in the study were: 'breast biopsy', 'ultrasound-guided core biopsy', 'breast ultrasound', and 'breast biopsy ultrasound'. As previous studies have shown, assuming that the user would watch the first videos in the search results, the first 100 videos were evaluated for each keyword, making a total of 400 videos (9). The videos were sorted by relevance using the YouTube search engine. Non-English videos, those with video and audio quality problems, off-topic videos, videos having duplicate contents, and educational videos intended for healthcare professionals were excluded. In addition, videos concerning alternative biopsy methods (open surgery and vacuum-assisted, stereotactic, magnetic resonance-guided biopsies) were excluded from the study. After applying the exclusion criteria, a total of 51 videos were included in the study.

**Table 1.** Scoring criteria for the reliability, content and quality of YouTube ultrasound-guided breast biopsy videos (10,11,22,23)

| Information topic | Criteria |
|---|---|
| Reasons for a breast biopsy | Palpable mass on examination<br>Suspicious finding on imaging (ultrasound, mammography or MRI) |
| Risks | Bruising, swelling, infection, and bleeding |
| Patient preparation | History of allergies<br>Is s/he using anticoagulants?<br>Has s/he used aspirin within the last seven days? |
| Biopsy methods | Fine-needle aspiration biopsy<br>Core needle biopsy<br>Stereotactic biopsy<br>Ultrasound-guided core needle biopsy<br>MRI-guided core needle biopsy<br>Surgical biopsy |
| Post-procedure care and review of results | -Bandages and an ice pack over the biopsy site<br>-Rest and normal activity (Although you should take it easy for the rest of the day, you will be able to resume normal activities within a day)<br>- If there is bruising, acetaminophen and an ice pack<br>- Discussing the results by the multidisciplinary team (radiologist, pathologist, and surgeon) and reporting them within a few days |

*Not mentioned: 0, Mentioned briefly: 1, Mentioned in detail: 2. Total score: not useful (0), slightly useful (1-3), useful (4-7), very useful (8-10).*

***Evaluation of usefulness***

According to predetermined criteria, the videos were independently evaluated and scored by two interventional radiologists with eight and seven years of experience in breast biopsy (Table 1). These criteria were determined by referring to the patient information forms prepared by the American Cancer Society (ACS) and American College of Radiology (ACR) for breast biopsy (10,11). According to the determined criteria, an ideal video was accepted as a good source of information for the patient. Usefulness was scored based on these criteria, and accordingly the videos were divided into four categories as very useful, useful, slightly useful, and not useful (Table 1). In this study, when there was a disagreement between the researchers during video scoring, this was resolved by discussing the issue until a consensus was reached.

***Assessment of reliability***

A modified DISCERN instrument was used to evaluate the reliability of YouTube videos. Developed by Charnock et al. (12, 13), DISCERN has also been used in previous studies (6,14). This instrument consists of five questions which are answered by yes or no. Each yes answer is scored 1, with the maximum being 5 (Table 2).

**Table 2.** Modified DISCERN reliability instrument developed by Charnock et al. (13)

| | **Modified DISCERN reliability instrument** |
|---|---|
| 1 | Is the video clear, concise, and understandable? |
| 2 | Are valid sources cited? |
| 3 | Is the information provided balanced and unbiased? |
| 4 | Are additional sources of information listed for patient reference? |
| 5 | Does the video address areas of controversy/uncertainty? |

***Video parameters and sources***

For each video, the name, URL, upload source, length, and availability of English subtitles were recorded. In addition, days since upload, number of views, number of comments, and number of likes and dislike were noted. According to the upload source, the videos were divided into four categories: physician/hospital (P/H), medical website (MW), commercial website (CW), and civilian individual (CI).

***Ethical approval***

In this study, videos that could be accessed by anyone were evaluated, and since there was no human or animal participation in the study, there was no need to obtain ethics committee approval. Previous studies have followed a similar procedure (5,6).

***Statistical analysis***

All analyses were undertaken using SPSS software v. 22.0 (IBM SPSS Statistics Version 22.0. Armonk, NY: IBM Corp.). The variables were divided into the two categories of categorical and continuous. Categorical variables were expressed as numbers and percentages and compared with the $\chi 2$ test. Continuous variables were obtained as median (minimum-maximum). The Shapiro-Wilk test was used to test normality, and $p > 0.05$ was considered to indicate normally distributed data. Continuous variables without normal distribution were compared with the Kruskal–Wallis test. A correlation analysis was conducted between the variables using Spearman's rank test. Cohen's Kappa coefficient was used to determine the inter-rater agreement between the two independent researchers. The statistical significance level was accepted as $p < 0.05$.

## Results

After applying the exclusion criteria, 51 of 400 videos were analyzed. According to the usefulness score, 13.7% (n = 7) of the videos were very useful, 41.2% (n = 21) were useful, 41.2% (n = 21) were slightly useful, and 3.9% (n = 2) were not useful. Of the very useful videos, 85.7% (n = 6) had been uploaded by P/H. Not useful and very useful videos were significantly longer (p = 0.01). There was no significant difference when the paired groups were compared among themselves in terms of duration. The DISCERN score was significantly higher in very useful videos (median: 4, range: 2-5, p < 0.001) (Figure 1). However, the number of views, likes, dislikes and comments per day was similar between the groups (Table 3 and 4).

In the comparison of video parameters according to the upload source, the length and number of likes and comments of the videos uploaded by CI were significantly higher compared to the other sources (p = 0.005, p = 0.046 and p = 0.013, respectively) (Figure 2). In addition, the DISCERN score was significantly higher in the videos uploaded by P/H and MW (p < 0.001) (Table 5).

Spearman's rank correlation analysis revealed a positive correlation between the DISCERN and usefulness scores (r = 0.725, p < 0.001). The kappa coefficient, showing the agreement between the two independent researchers, was calculated as 0.70.

## Discussion

This study analyzed the quality of the information provided in YouTube videos in informing patients about the most used UGBB diagnostic tools for breast masses. The videos were categorized according to the usefulness scores that were also utilized in previous studies (15,16).

**Table 3.** Distribution of video parameters by the usefulness classification

| Variables | Very Useful | Useful | Slightly useful | Not useful | P value |
|---|---|---|---|---|---|
| Videos, n (%) | 7 (13.7) | 21 (41.2) | 21 (41.2) | 2 (3.9) | |
| Duration (seconds)* | 333 (230-836) | 188 (89-828) | 103 (22-758) | 517.5 (310-725) | **0.01**[a] |
| Views per day* | 5.6 (0-57.9) | 3.7 (0.1-295.1) | 4.9 (0.1-134.6) | 1.5 (1.1-2) | 0.938 |
| Likes per day* | 0.1 (0-0.1) | 0.1 (0-0.3) | 0.1 (0-0.5) | 0.1 (0-0.1) | 0.247 |
| Dislikes per day* | 0 (0-0.02) | 0 (0-0.1) | 0.01 (0-0.02) | 0 (0-0.1) | 0.296 |
| Comments per day* | 0.1 (0-0.2) | 0 (0-0.1) | 0 (0-0.2) | - | 0.318 |
| DISCERN score* | 4 (2-5) | 3 (1-4) | 2 (0-3) | - | **<0.001**[a] |

**All data are expressed as median (minimum–maximum), [a] p < 0.005*

**Table 4.** Usefulness scoring by upload sources

| Variables | Very Useful | Useful | Slightly useful | Not useful |
|---|---|---|---|---|
| **Upload source, n (%)** | | | | |
| Physician or hospital | 6 (85.7) | 12 (57.1) | 7 (33.3) | 2 (100) |
| Medical website | 0 | 6 (28.6) | 5 (23.8) | 0 |
| Commercial website | 0 | 1 (4.8) | 5 (23.8) | 0 |
| Civilian | 1 (14.3) | 2 (9.5) | 4 (19) | 0 |

**Table 5.** Comparison of video parameters according to the upload source

| Variables | Physician or hospital | Medical website | Commercial website | Civilian individual | Total | P value |
|---|---|---|---|---|---|---|
| Videos, n (%) | 27 (52.9) | 11 (21.6) | 6 (11.8) | 7 (13.7) | 51 | - |
| Duration* (seconds) | 203 (41-828) | 140 (88-526) | 45.5 (22-376) | 706 (89-836) | 13783 | 0.005[a] |
| Number of views* | 5748 (0-562604) | 6304 (46-345800) | 903 (70-153099) | 3628 (500-86012) | 2330971 | 0.580 |
| Number of likes* | 4 (0-563) | 1 (0-452) | 3 (0-273) | 66 (4-804) | 4438 | 0.046 |
| Number of dislikes* | 0 (0-169) | 0 (0-37) | 0 (0-18) | 1 (0-34) | 435 | 0.715 |
| Number of comments* | 0 (0-213) | 0 (0-53) | 0 (0-10) | 33 (0-251) | 1127 | 0.013[a] |
| Days since upload* | 1869 (247-4294) | 1885 (384-3437) | 1467 (715-2471) | 1510 (260-3171) | 87362 | 0.812 |
| Subtitle n (%) | 24 (88.9) | 10 (90.9) | 6 (100) | 7 (100) | 47 (92.2) | 0.676 |
| DISCERN score* | 3 (0-5) | 3 (2-4) | 2 (1-3) | 1 (0-2) | - | 0.001[a] |

**All data are expressed as median (minimum–maximum), [a] p < 0.005*

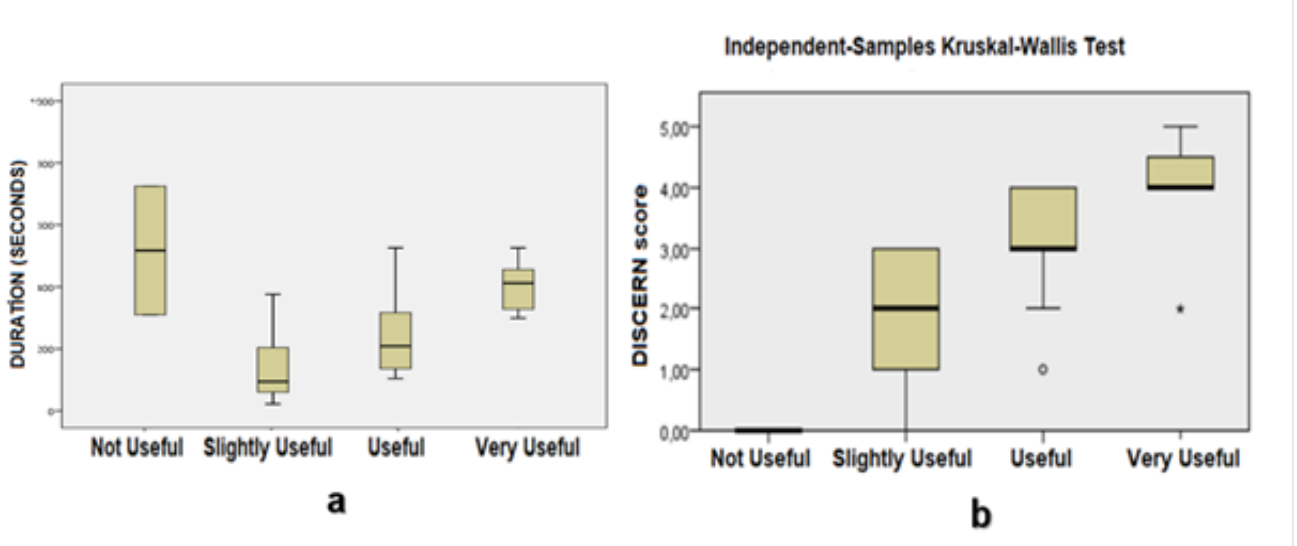


**Figure 1.** Box plot showing the distribution of the DISCERN scores and video duration in the study groups. The results of the independent-samples Kruskal-Wallis test reveal that as the usefulness of the videos increases, their DISCERN scores also increases.

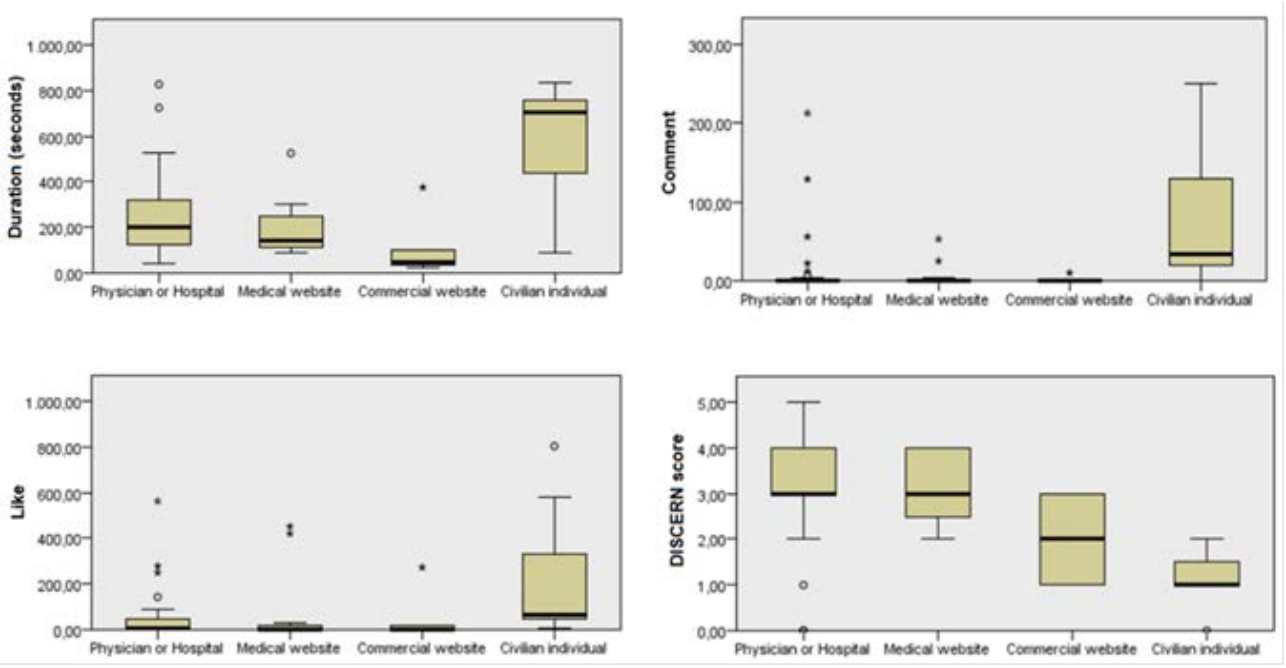


**Figure 2.** Comparison of video parameters by the Kruskal-Wallis test according to the upload sources. The comparison of video parameters by the upload source reveals that the length and number of comments and likes are higher and the DISCERN score is lower for the videos uploaded by civilian individuals.

For this classification, the ACS and ACR guidelines related to breast biopsy were taken into consideration and parameters concerning the reasons for a breast biopsy, preparations to be done before the procedure, alternative biopsy methods, post-procedure care, and biopsy results were obtained and evaluated. According to this guideline, an ideal video should cover all of the criteria listed above. However, most of the videos analyzed in this current study were irrelevant or not intended for patients, despite targeted searches. Generally, information about pre-procedure preparation, risks of the process, and post-procedure care was missing; however, more than half the videos did provide useful information for patients. Of the videos examined, 41.2% were in the useful category and 13.7% in the very useful category. Different useful video rates have been reported in previous studies evaluating videos about various diseases. A similar usefulness rate to the results of our study was reported by Kocyigit et al.(17), Tolu et al.(18), and Garg et al.(19), stating that approximately 50% of the videos were useful. In contrast, Rittberg et al.(9), Jain et al.(8), and Abboudi et al.(5) determined that the rates of useful videos as 19.6%, 12.2% and 2% respectively. There may be several reasons for these conflicting results between studies. Previous researchers evaluated YouTube videos about different diseases or procedures, such as ankylosing spondylitis exercises, rheumatoid arthritis, dialysis, methotrexate self-injection techniques, TRUS-guided prostate biopsy, and ureteroscopy. Since there are no objective criteria in the evaluation of videos, the results were obtained in a subjective manner. In addition, the number of videos evaluated in these studies also differs. According to our results, the DISCERN scores increased in parallel with the usefulness score of the videos analyzed. Furthermore, our results indicate that useful videos are also more reliable.

When the usefulness of the videos were evaluated according to their upload sources, the primary sources of very useful videos were P/H and MW. Slightly useful or not useful videos had been generally uploaded by CW and CI but some of these videos belonged to the P/H group. The low-score videos uploaded by P/H often referred to the necessity of the procedure but did not contain adequate information about the risks of and preparation for the procedure or post-procedure care. In the literature, researchers report that very useful videos are mostly provided by professional healthcare providers or hospitals, and not-useful videos by advertising sites, CI, and non-profit organizations (6,9,17). However, Jain et al.(8) noted that even professional healthcare professionals did not provide adequate information on prostate biopsy for patients. In this digital age, patients are more likely to refer to the internet to familiarize with the procedure, and healthcare professionals are responsible for directing them to very useful information sources. Since patients generally consider the content published by medical professionals to be more reliable, the low standard of these videos will have a negative effect on them. For procedures involving many stages, such as biopsies, medical professionals' informative videos should be both short enough for patients not to lose interest but detailed enough to cover all steps.

The number of views is one of the most important indicators of the popularity of a video posted on YouTube. Users can also leave comments under the videos according to how they feel and what they think about the video or they can

click the like or dislike button. Previous studies have produced controversial results regarding the number of likes and dislikes. While Kocyigit et al.(17) and Singh et al.(20) reported no significant relationship between the number of views or that of likes per day and usefulness, many studies have indicated that these parameters were higher in useful videos (18,21). In the current study, no significant difference was found between the usefulness groups in terms of likes, dislikes and comments per day.

The length of a video may be an important attribute for covering all the relevant information about the topic. According to our findings, very useful videos videos were longer in contrast to most previous studies having indicated no relationship between quality and length (14,18). Similar to our findings, Akyol et al.(6) noted the presence of a correlation between video quality and length. When we evaluated the video length according to the upload source, the videos that had been uploaded by CI were longer, which may be due to the desire of individuals to also convey their own feelings about a procedure or disease and become more popular by gaining more followers. In addition, the videos uploaded by CI had a higher number of likes and comments per day compared to the remaining upload sources. Patients may have felt the need to comment more on the video or press the like button since they felt close to other individuals with similar experience. In addition, the reason for the fewer comments being posted for videos uploaded by healthcare professionals may be patients not believing that they have as much knowledge or evaluation ability about the topics as these professionals.

There were some limitations to this study. First, the sample size was relatively small, and only English language videos were analyzed. Second, the application of the video evaluation criteria may have been affected by the subjective assessment of the researchers. Finally, these results show the usefulness of the information in the video at a certain point in time, and the results may change over time as more videos are added or removed. However, it is important to note that this was the first study to investigate the usefulness of YouTube videos about UGBB. Further work is needed to determine how YouTube videos on UGBB affect patients.

## Conclusion

YouTube is an easily accessible online resource for obtaining information about the UGBB method. There are many YouTube videos of different quality uploaded by various sources that describe the steps of this procedure. Although P/H and MW were the primary source of very useful videos, the current study also showed that a significant portion of not-useful videos had also been posted by this group. Patients are generally unable to distinguish useful videos, and therefore medical professionals should take more care to upload well-informed and reliable videos to inform patients about UGBB and reduce their concerns and anxiety about this procedure. According to our study, it would be appropriate for the patients to consider the recommendations of the professional medical team in the center they applied, as the currently available YouTube videos are not sufficient to meet this requirement. Furthermore, breast radiologists alongside with the hospitals' audiovisual departments should consider this and provide adequate information.

***Ethical Approval:*** *In this study, videos that could be accessed by anyone were evaluated, and since there was no human or animal participation in the study, there was no need to obtain ethics committee approval.*

***Author Contributions:***
*Concept: V.K., M.T.*
*Literature Review: V.K., M.T., O.K.*
*Design : V.K., M.T.*
*Data acquisition: O.K., M.T.*
*Analysis and interpretation: V.K., M.T., O.K.*
*Writing manuscript: V.K., M.T.*
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